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DESIGN GUIDE FOR GYMNASIUMS, FIELD HOUSES, AND INDOOR SPORTS COMPLEXES

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A. Purpose of the Design Guide

This design guide provides selected general information and specific criteria for the design of facilities that support the Air Force's indoor sports programs. The guide is intended to promote designs that are aesthetically pleasing, economical, safe, efficient, and accessible to all users. Because each design must be compatible with the specific site conditions, and be an individual solution for the particular needs of the base, this guide is not intended to be a comprehensive design manual or regulation.

B. Scope of the Design Guide

This guide applies to new construction and renovations in the continental United States and overseas. The chapters of this guide include information for initial planning, design objectives and criteria, and practical considerations for project design.

- Initial Planning: Chapter 2 includes project objectives, optional facility descriptions and programs, and factors for evaluating the adaptation of an existing structure or the selection of a site.
- Design Objectives: Chapter 3 lists the primary goals of the design.
- General Design Criteria: Chapter 4 includes the basic project requirements for the design.
- Space Criteria: Chapter 5 includes descriptions, sizes, construction requirements and typical arrangements for each functional space that may be included in the facility.
- Project Design: Chapter 6 includes cost implications, spatial relationships, environmental influences, principles of organization, and sample design schemes to illustrate and encourage innovative design solutions.
- Appendices: Chapter 7 lists technical documents that establish the detailed design standards. Information contained in these documents is only duplicated in this guide where specific applications of these standards are important to basic design decisions.

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C. Use of the Design Guide

This guide is intended primarily for use by the design agency for the project. However, the information included in this guide, in conjunction with other Air Force criteria and procedures, can also be used by the base programmer, MAJCOMs, and other parties, in the preparation of planning documents for the construction funding program, such as *DD Form 1391* and the *Project Book*.

D. Primary General Reference Documents

Specific reference documents that establish the technical requirements for various aspects of the design are referenced in the chapters that follow. The documents listed below, however, provide the basic standards for the general development of the design:

- *DOD 4270.1-M: Construction Criteria Manual.*
- *AFM 86-2, Standard Facility Requirements.*
- *AFM 88-15, Air Force Design Manual Criteria and Standards for Air Force Construction.*
- *AFP 215-34, Morale, Welfare and Recreation Objectives.*
- *AFR 215-1, Morale, Welfare, and Recreation (MWR) Programs and Activities.*
- *AFR 215-22, Air Force Sports Program (PA).*
- *AFR-215-24, Air Force Competitive Recreation and Sports Activities.*

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A. Objectives of the Project

The project is intended to result in a facility that supports the Air Force mission described in *AFR 215-1*, and provides and promotes the specific MWR programs and activities described in *AFR 215-22*. The facility is intended to provide a wide variety of sports activities, encouraging maximum participation and promoting physical fitness and health. The facility shall offer those sports programs that satisfy the leisure time needs and interests of Air Force personnel as well as provide spectator entertainment. These programs should encourage the development of athletic skills, while stressing leadership, fellowship, and a competitive and cooperative spirit.

B. Type of Facility

Three general types of facilities are available to support the objectives of the project.

1. Gymnasium

This facility provides indoor covered space for self-directed sports, instructional programs, intramural/varsity sports and spectator activities. However, gymnasiums do not include specific indoor spaces for running, swimming or tennis.

2. Field House

This facility provides the same activities as gymnasiums but also includes indoor running, swimming or tennis. Field houses are allowed for bases with a military strength of 7,000 or more.

3. Indoor Sports Complex

This facility contains a combination of various authorized sports activities, such as tennis, swimming, running, basketball, and racquetball/handball. Base size does not necessarily determine where a complex is permitted. Generally, indoor sport complexes are provided for large bases when it is preferable to combine various sports activities at one central location. An indoor sports complex is justified at locations with adverse climates, and where it would result in construction economy, a higher utilization and greater operating efficiency, when compared with separate facilities.

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C. Size of Facility

The overall size for each type of facility shall not exceed the limits set in *AFM 86-2.*

1. Gymnasium

The size and number of gymnasiums allowed is based on the active duty military population and a percentage of the dependent population, the number and size of existing gymnasiums, and whether the proposed facility is new or a conversion of an existing structure. The allowable size and number of handball/racquetball and squash courts within a gymnasium is based on the active duty military population and the number of existing courts on the base.

2. Field House

The allowable size for a field house is based on the active duty military population of the base. The allowable size and number of handball/racquetball and squash courts within a field house is based on the active duty military population and the number of existing courts on the base.

3. Indoor Sports Complex

The size of an indoor sports complex is the sum of the allowable sizes and number of the authorized spaces to be included. The functions, sizes, and numbers of spaces provided by the indoor sports complex and by existing facilities shall not exceed the totals authorized for the entire base.

D. Program of Spaces

The selection of both interior and exterior spaces to be included shall satisfy the particular needs and policies of the base, and shall comply with the overall size and budget limitations for the project. The following factors shall be considered:

1. User Needs and Preferences

The specific types, number, and sizes of spaces appropriate for the users will vary depending on the climate, location, and demography of the base.

2. Operating Policies

The specific types, number, and sizes of spaces to be included will depend on staffing and funding limitations, flexibility for time sharing and activity changes, and opportunities offered by the local civilian community. A predetermined plan of operation based on Air Force requirements, base characteristics, and proven operating procedures is encouraged to guide the selection of spaces to be included in the design. Also, certain athletic equipment will not be funded as part of the construction contract, but from other sources. To further aid the selection of spaces requiring equipment, and also to satisfy budget limitations, the particular funding sources for the equipment shall be determined.

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3. Gross and Net Area

The maximum allowable sizes listed for gymnasiums, field houses, and indoor sports complexes in *AFM 86-2* are gross floor areas. Gross area includes public lobbies, public toilets, corridors, stairs, walls, and structure, as well as the net floor areas of the functional spaces. The ratio of total net area to the gross area for these facilities shall approximate 0.75. Likewise, the sum of the floor areas for the public lobby, corridors, stairs, public toilets, mechanical and maintenance spaces, and the walls and structure shall not exceed 25 percent of the gross floor area. Tables 2-1 through 2-3 list typical space compositions and areas for various size facilities. These tables are guides only. Specific space compositions and areas shall satisfy the particular project needs.

Table 2-1: Gymnasium Program of Spaces

	Required or Optional	*Range in Sizes*	
Activity Spaces		ft.²	m²
Gymnasium Court	R	5800 - 10,460	538.8 - 971.7
Handball/Racquetball Courts	R	800	74.3 per court
Weight Room	R	800 - 1600	74.3 - 148.6
General Exercise Room (1 or 2)	R	800 - 1600	74.3 - 148.6
Jogging Track	O	2400 - 2800	223 - 260
Support Spaces			
Locker Rooms (2)	R	600 - 800	55.7 - 74.3
Shower & Toilet Rooms (2)	R	500 - 700	46.5 - 65.0
Saunas (2)	R	100 - 150	9.8 - 13.9
Steam Rooms (2)	O	100 - 150	9.3 - 13.9
Staff Spaces			
Offices	R	200 - 300	18.6 - 27.9
Laundry	R	100 - 150	9.3 - 13.9
Equipment Issue Room	R	100 - 300	9.3 - 27.9
Public Spaces			
Concession/Vending	O	100	9.3
Net Area		***75% of Gross Area***	
Public Lobby, Corridors, Stairs	R	Not more than 15% of Gross Area	
Public Toilets (2)	R	200 - 250	18.6 - 23.2
Mechanical & Maintenance	R	3% of Gross Area	
Walls and Structure	R	7% of Gross Area or Less	
Gross Area		***Authorized Size or Less***	

Note: The total area for the public lobby, corridors, stairs, public toilets, mechanical, maintenance, walls and structure shall not exceed 25% of the gross area.

E. Adaptation of an Existing Structure

An existing structure may be adapted for this use if the following conditions are satisfied:

1. Size of the Existing Facility

The floor area available in the existing structure shall be at least as large as the overall size planned for the project, or be able to be increased to this size by simply providing an addition to the structure.

2. Building Configuration

The form and volume of the existing structure shall allow for the varying ceiling heights and unobstructed floor areas required for the selected spaces of the project.

3. Building Condition

The existing facility shall be structurally sound and economical to renovate, operate and maintain.

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4. Location on the Base

The existing facility shall be convenient to outdoor recreational areas, playing fields, and housing.

5. Image

The appearance of the existing facility shall be adaptable, without extensive alterations, to an architectural character appropriate for a sports facility.

Table 2-2:
Field House
Program of Spaces

	Required or Optional	Range in Sizes ft.²	Range in Sizes m²	Small Field House Sizes ft.²	Small Field House Sizes m²	Large Field House Sizes ft.²	Large Field House Sizes m²
Activity Spaces							
Gymnasium Court	R	6,800 - 12,740	631.7 - 1,183.6	10,460	971.7	7,830	727.4
Handball/Racquetball Courts	R	800 per ct.	74.3 per ct.	8@800	8@74.3	3@800	3@74.3
Squash Courts	O	600 per ct.	55.7 per ct.	2@600	2@55.7	—	—
Weight Room	R	1,200 - 2,000	111.5 - 185.8	1,600	148.6	1,600	148.6
General Exercise Room (1 or 2)	R	1,200 - 2,400	111.5 - 223.0	1,600	148.6	1,600	148.6
Swimming Pool	R	7,750 - 10,410	777.0 - 1,043.5	8,750	812.9	10,410	967.1
Tennis Courts	O	7,000 per ct.	650.3 per ct.	—	—	2@7,000	2@650.3
Jogging Track	O	2,400 - 2,800	223 - 260	2,400	223	2,800	260
Support Spaces							
Locker Rooms (2)	R	2,000 - 2,200	185.8 - 204.4	2,000	185.8	2,200	204.4
Shower and Toilet Rooms (2)	R	1,400 - 1,500	130.0 - 139.4	1,400	130.0	1,500	139.4
Saunas (2)	R	200 - 300	18.6 - 27.9	250	23.2	280	26.0
Steam Rooms (2)	O	200 - 300	18.6 - 27.9	250	23.2	280	26.0
Staff Spaces							
Offices	R	450 - 500	41.8 - 46.5	450	41.8	500	46.5
Classroom	O	150	13.9	—	—	150	13.9
Laundry	R	150	13.9	150	13.9	150	13.9
Equipment Issue Room	R	350 - 400	32.5 - 37.2	350	32.5	400	37.2
Public Spaces							
Concession/Vending	O	150	13.9	—	—	150	13.9
Juice Bar/Lounge	R	200 - 250	18.6 - 23.2	240	22.3	250	23.2
Net Area		***= 75% of Gross Area***		***37,500***	***3484***	***46,500***	***4,320***
Lobby, Corridors, Stairs	R	15% of Gross or Less		6,300	585.3	7,500	696.8
Public Toilets (2)	R	300 - 400	32.5 - 37.2	350	32.5	400	37.2
Mechanical and Maintenance	R	3-5% of Gross Area		1,350	125.4	2,100	195.1
Walls and Structure	R	9% of Gross or Less		4,500	418.1	5,500	511.0
Gross Area		***= Authorized Size or Less***		***50,000***	***4,645***	***62,000***	***5,760***

Note: The total area for the public lobby, corridors, stairs, public toilets, mechanical, maintenance, walls and structure shall not exceed 25% of the gross area.

F. Site Selection

When an available existing structure cannot be reasonably or economically adapted, a suitable site shall be selected for new construction. One or more sites may be designated on the Base Master Plan as appropriate for sports and recreational activities. Where a choice of sites is available, the following criteria should be considered as part of the selection:

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1. Site Size

The site shall be large enough to accommodate all the components of the facility, including those expected to be added in the future. These components include parking, playing fields, and the building. In addition, the size of the site shall allow for open or landscaped spaces around the components for drives and walks, safe separation between activities, grading transitions, and required clearances from adjacent property. For initial planning purposes, the site size can be considered satisfactory if the area of the site is at least the sum of the following:

Table 2-3: Sports Complex Program of Spaces

	Required or Optional	Range in Sizes ft.²	Range in Sizes m²
Activity Spaces			
Gymnasium Court	O	6,800 - 12,740	631.7 - 1,183.6
Handball/Racquetball Courts	O	800 per ct.	74.3 per ct.
Squash Courts	O	600 per ct.	55.7 per ct.
Swimming Pool	O	7,750 - 17,260	719.9 - 1,606.2
Tennis Courts	O	7,000 per ct.	650.3 per ct.
Jogging Track	O	2,400 - 2,800	223 - 260
Weight Room	O	800 - 2,000	74.3 - 185.8
Gen. Exercise Room (1 or 2)	O	800-2400	74.3 - 223.0
Support Spaces			
Locker Rooms (2)	R	2,000 - 2,200	185.8 - 204.4
Shower and Toilet Rooms (2)	R	1,400 - 1,500	130.0 - 139.4
Saunas (2)	R	200 - 300	18.6 - 27.9
Steam Rooms (2)	O	200 - 300	18.6 - 27.9
Staff Spaces			
Offices	R	100 - 500	9.3 - 46.5
Laundry	R	100 - 200	9.3 - 18.6
Equipment Issue Room	R	100 - 300	18.6 - 23.2
Public Spaces			
Concession/Vending	O	150	13.9
Juice Bar/Lounge	O	200 - 250	18.6 - 23.2
Net Area		*= 75% of Gross Area*	
Lobby, Corridors, Stairs	R	15% of Gross or Less	
Public Toilets (2)	R	300 - 400	32.5 - 37.2
Mechanical and Maintenance	R	3% of Gross Area	
Walls and Structure	R	7% of Gross or Less	
Gross Area		*= Authorized Size or Less*	

Note: The total area for the public lobby, corridors, stairs, public toilets, mechanical, maintenance, walls and structure shall not exceed 25% of the gross area.

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a. 400 square feet (37.2 m²) for each parking space. The number of parking spaces shall total at least one for each 100 military members of the base, and one for each full time staff member of the facility.

b. The area of each playing field, outdoor jogging track, and other training courses.

c. The gross area of the building.

d. Areas for space around each playing field and the building, estimated by using Table 2-6, assuming about 20 feet (6.1 m) clear around each component:

2. Convenience to Related Activities

A site near existing playing fields and jogging trails is preferred.

3. Convenience to Other Activities

A site offering the opportunity for personnel to commute on foot or by bicycle from major housing or work centers to the facility is preferred.

4. Restricted or Hazardous Areas

A site near an area that would expose personnel to danger shall be avoided.

5. Access Considerations

The site shall be located where excessive traffic flow will not be created through housing or community centers. Bus access and nearby overflow parking areas shall be available to the site.

6. Environmental Conditions

a. Topography. The site shall be able to accommodate both the building and activity fields without extensive grading and potential damage to existing drainage runoff patterns.

b. Soil conditions. The soil shall be suitable for the support of the facility without extensive foundation structures, rock excavation, or compacted earthwork.

c. Utility lines. The site shall be readily available to the required utility services, but shall also be free of infringing rights-of-way that might limit the site's use.

Table 2-4: Site Size

Area of Playing Field or Gross Area of Building		Area of Surrounding Space to be Added	
ft.²	m²	ft.²	m²1860
5000 or Less	460 or Less	7000	650
5000- 7499 .	460- 699	8000	740
7500- 9999 .	700- 929	9000	840
10,000-12,499 ..	930-1159	10,000	930
12,500-14,999 ..	1160-1389	11,000	1020
15,000-17,499 ..	1390-1629	12,000	1110
17,500-19,999 ..	1630-1859	13,000	1210
20,000-24,999 ..	1860-2319	14,000	1300
25,000-29,999 .	2320-2789	15,000	1390
30,000-34,999 .	2790-3249	16,000	1490
35,000-39,999 .	3250-3719	17,000	1580
40,000-44,999 .	3720-4179	18,000	1670
45,000-49,999 .	4180-4639	19,000	1770
50,000-60,000 .	4640-5570	20,000	1860
60,000 or More	5570 or More	33% of component's area	

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A. Architectural Character

The design should emphasize and express the importance of a gymnasium, field house or indoor sports complex in the athletic program of the base. The design shall also complement the existing architectural character of the base. There is no mandatory architectural style, but the design shall clearly identify the function of the facility and present an image that invites use.

B. External Circulation

A single public entrance as well as access from the building to playing fields shall be provided. A service entrance that is protected from the weather is also required. Access to the service entrance shall not obstruct public traffic and walkways.

C. Zoning

Spaces having common characteristics, such as high ceilings or similar environmental systems, shall be organized together, except where the function of the facility requires their separation. All spaces within the building shall be available for use at all times that the facility is open. Mechanical equipment spaces shall be separated from public and activity spaces.

D. Internal Circulation

A clear circulation system shall be provided for ease of movement by the users, and to permit convenient access by spectators to viewing areas. The internal circulation system shall accommodate the potential expansion of the facility. In addition, circulation for maintenance operations shall be separate from and not interfere with user circulation.

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E. Operation Controls

A single security and observation station shall be centrally located to allow the staff to conveniently monitor entrances, the circulation system, and activity areas.

F. Flexibility

The spaces shall be organized to allow for changing user needs and preferences. Floor loading capacity, ceiling heights, and wall systems shall accommodate a reasonable variety of uses. Spaces likely to be expanded or to increase in number shall be located along the outside of the building. Construction materials and systems shall be selected to permit economical extensions to the building.

G. Storage

Adequate storage space for athletic equipment is required for the effective operation of the facility.

H. Durability and Maintenance

Interior surfaces, details, and finishes shall be resistant to wear and impact, and shall be able to be economically maintained. Difficult to clean areas, such as awkward corners and ledges, shall be avoided. Surface materials that will withstand hard use over an extended period of time without requiring frequent repair shall be utilized throughout. Provisions shall be included to ease maintenance operations, such as providing means for the relamping of light fixtures located high above the floor.

I. Acoustical Controls

The transmission of noise between spaces and the amount of noise reverberation within a space shall be minimized.

J. Environmental Controls

Carefully controlled temperature, humidity, and ventilation levels are required to provide a comfortable environment for the vigorous activities within the facility.

K. Illumination

The design shall include both natural and artificial light sources to the extent that is advantageous for athletic activities. Glare shall be avoided in athletic spaces.

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A. Site Work

The design shall comply with the standards listed in Table 7-1, as well as satisfy the following general criteria.

1. Layout and Drainage

Playfields shall be located on areas of the site that best approximate natural level conditions. Positive drainage shall be provided to eliminate ponding on playfields and around the building.

2. Paving

Jogging trails and paths leading to playfields shall be surfaced with loose materials that minimize injury, such as 1" wood chips or ¾" pea gravel. Paved parking areas shall be readily accessible to the building entrance and, where spectator viewing is provided, to playfields. Walks from parking areas to the building entrance and to spectator viewing at playfields shall be paved, except where these walks also serve as jogging trails and paths for participants. Some of the playfields shall be considered for use as overflow spectator parking areas and their location and the walkway system shall allow for such usage.

3. Landscaping

Provisions for exterior cool-down areas for participants, such as providing shade trees bordering playfields, shall be included as part of the landscaping design. Landscape materials natural to the locality shall be used wherever possible.

B. Structure

The design shall comply with the standards listed in Tables 7-2 and 7-3, as well as satisfy the following general criteria.

1. Special Loads

The structural system shall be sufficiently rigid to minimize impact-induced vibration caused from athletic activity, such as the dropping of weights and excessive crowd movement.

2. Materials

In spaces subject to high humidity levels, such as indoor swimming pool enclosures or shower and locker rooms, the structural materials or the materials protecting structural elements shall be capable of resisting deterioration caused by condensation. Likewise, in geographical areas subject to adverse climates, industrial atmospheres or coastal exposures, structural materials shall be selected to minimize thermal expansion and to resist corrosion. The use of concrete or protective coatings on steel and wood, and the provision of sufficient expansion joints are necessary.

3. Framing

The framing system shall provide the clear spans required for athletic courts and shall allow for the integration of elements required for the court activities, such as divider curtains, ceiling mounted athletic equipment, lighting fixtures, and mechanical equipment.

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C. Architecture

The design shall comply with standards listed in Tables 7-2 and 7-3, as well as satisfy the following general criteria.

1. Building Enclosure

a. Materials. Facilities located in geographical areas subject to adverse climates, industrial atmospheres, or coastal exposures shall be constructed of exterior materials that minimize thermal expansion and resist corrosion.

b. Natural Daylighting. Windows and/or skylights shall be provided, along with artificial lighting, for all spaces except storage rooms, gymnasium court, handball/racquetball courts, squash courts, shower and toilet rooms, saunas, steam rooms, public toilets, and mechanical rooms. Blinds, light shelves, screens, and translucent glazing materials shall be used, where necessary to eliminate reflected glare, direct sun penetration, and silhouetting.

2. Acoustics

The facility shall be designed to achieve the acoustical properties listed in Table 4-1.

Table 4-1:
Acoustic Design Standards

	Maximum Expected Generated Sound Level	*Ambient Noise*	*Sound Insulation*	*Sound Absorption*
	PWL[1]	PNC[2]	STC[3]	NCR[4]
Gymnasium Court	95	35 - 45	50 - 60	60 - .80
Other Activity Spaces	80	34 - 45	50 - 60	60 - .80
Support Spaces	60	35 - 40	45 - 50	40 - .50
Staff Spaces	40	30 - 35	43 - 47	30 - .40
Public Spaces	50	35 - 40	43 - 50	30 - .40

1 PWL = Magnitude of Sound
2 PNC = Preferred Noise Criteria
3 STC = Sound Transmission Class
(all of the above measured in decibels)
4 NRC = Noise Reduction Coefficient

3. Finishes

a. Floors in athletic activity spaces shall be:
- Continuous without significant joints that would adversely affect play.
- Sufficiently resilient to permit the natural bouncing of balls and encourage jumping and running by participants, without being so soft as to slow the activity, or so hard as to cause jarring and injury.
- Able to provide adequate traction for the participant, without being so textured as to cause floor burns, or so smooth as to cause loss of footing.
- Able to withstand excessive use by participants and equipment.
- Able to accommodate court markings and special equipment inserts.
- Finished to reduce glare from reflected light.

b. Floors in athletic activity spaces, except the swimming pool, shall be either hardwood or synthetic rubber.
- Hardwood floors shall be used in spaces where court markings may be periodically changed.
- Synthetic floors shall be used where court markings can be made permanent, and where traction is most important.

c. Floors in spaces associated with high humidity or standing water, such as shower and toilet rooms and swimming pool decks, shall be waterproof with non-slip surfaces.

d. Floors in spaces intended for quiet use, such as lounges, shall be sound absorbent. Carpet shall conform to criteria in the latest edition of *AFM 88-15.*

e. Walls in athletic activity spaces shall be:
- Rigid to withstand impact loads.
- Nonabrasive and padded to a wainscot height of at least 6 feet (1.8 m) at the tennis court, jogging track, and behind basketball goals in the gymnasium court.
- Flush, without projections and surface-mounted items such as fire extinguishers and cabinets, except in areas with little athletic activity.
- Without sharp corners.
- Able to support wall-mounted athletic equipment, such as scoreboards and basketball backboards.

f. Walls and ceilings in toilet and shower rooms, saunas and steam rooms shall be waterproof and humidity resistant.

g. Ceilings in athletic spaces shall be able to withstand impact loads of projectiles.

h. Ceilings in lobbies and corridors shall be sound absorbant.

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4. Color

The color of the walls and floors in the athletic courts shall contrast with the colors of the balls, shuttle cocks and court markings used in these spaces.

a. The color of all court markings shall be as recommended by the athletic agency regulating this sport.

b. All colors in activity spaces shall have a low light reflectance to minimize glare.

c. The primary color of each color hue and the extent of its use shall be suitable for the lamp temperature of the artificial lighting provided in each space. Colors enhanced by the lighting shall be used for accents. Colors unaffected by the lighting shall be used for major backgrounds. Colors grayed by the lighting shall be limited to minor backgrounds. Table 4-2 lists the recommended extent of use for primary colors with various types of lighting to be considered for the facility.

Table 4-2: Use of Color with Types of Lighting

Major Color	*Incandescent*	*Fluorescent*	*Metal Halide*
Blue	Limited Background	Limited Background	Accent
Green	Major Background	Accent	Accent
Yellow	Accent	Accent	Accent
Orange	Accent	Major Background	Major Background
Red	Accent	Limited Background	Accent
Deep Red	Major Background	Limited Background	Limited Background
White	Major Background	Major Background	Major Background
Black	Accent	Limited Background	Limited Background

D. Mechanical Systems

The design shall comply with the standards listed in Tables 7-3, 7-4 and 7-5 , as well as satisfy the following general criteria.

1. Plumbing

a. The domestic hot water temperature provided to lavatories, showers, and service sinks shall not exceed 105°F (40°C).

b. Shut-off valves shall be provided at all fixtures.

c. Floor drains shall be located in shower, steam, sauna, locker, laundry, and toilet rooms.

d. Information regarding the design of the filtration, drainage, recirculation, and overflow systems for interior swimming pools is found in the *Air Force Design Guide for Swimming Pools*.

2. Heating

The heating systems shall be zoned to provide consistent temperature levels in spaces subject to different solar exposures and heat gain. Inside heating design dry bulb temperatures shall be as follows:

- For activity spaces other than swimming pools, 57 to 60°F (14 to 16°C).
- For swimming pools, 72 to 75°F (22 to 24°C).
- For staff, support, and public spaces, 67 to 70°F (18 to 21°C).

3. Mechanical Ventilation

a. The room supply air rate shall not be less than .80 cfm per ft.^{2} of occupied floor area.

b. The outside air ventilation shall be at least 6 cfm per ft.^{2} at times when the outside is warmer than the building spaces, and 5 cfm per person at times when the outside is cooler than the building spaces.

4. Evaporative Cooling

Where allowed, evaporative cooling shall provide a maximum indoor temperature of 80°F (27°C) dry bulb.

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5. Air Conditioning

Where air conditioning is allowed, the inside comfort design temperature shall be 15°F less than the 2½ percent outside dry bulb weather conditions, but shall not exceed 78°F (25°C) or be less than 75°F (24°C). The relative humidity during cooling shall be at least 50 percent and shall at least equal the humidity level at the outside air dewpoint design temperature.

6. Air Conditioning, Evaporative Cooling, and Mechanical Ventilation Eligibility

The weather zones listed are defined in *AFM 88-15*, Chapter 6.

a. Weather Zone A: Evaporative cooling or air conditioning shall generally be provided.

b. Weather Zones B, C, and D: Mechanical ventilation only shall generally be provided.

Table 4-3:
Energy Budgets

Annual Cooling Degree Days	<2000	<2000	<2000	>2000
Annual Heating Degree Days	>5500	2000 - 5500	<2000	<4000
Energy Budget in Btu./Ft.²/Yr.	**55,000**	**50,000**	**45,000**	**50,000**

c. Exceptions to the general eligibility requirements are as follows:

- Staff offices may be air-conditioned in weather zones A, B, and C.
- Indoor swimming pools, enclosed tennis courts, and shower areas shall not be air-conditioned regardless of climatic conditions.
- Air conditioning may be provided in gymnasium courts and locker rooms of new facilities only in the following climates:
  - Where the outside dry bulb temperature is 93°F (33°C) or higher for more than 1300 hours in a year, and the outside wet bulb temperature is 73°F (23°C) or higher for more than 800 hours in a year.
  - Where the outside wet bulb temperature is 73°F (23°C) or higher for more than 4000 hours in a year.
- Air conditioning may be provided in racquetball/handball and squash courts, and in weight and general exercise rooms of 800 ft.² (74.3 m²) or less, with the following conditions:
  - For existing facilities in climate where the outside wet bulb temperature is at least 67°F (20°C) for at least 1,400 hours in a year.
  - For new facilities in climates where the outside wet bulb temperature is at least 67°F (20°C) for at least 1000 hours in a year.

7. Energy Budgets

The energy consumption of new buildings shall not exceed the energy amounts listed in Table 4-3, based on 16 operating hours daily and 7 operating days weekly, with hot water as a process load.

8. Solar Applications

a. Normal passive solar applications described in *AFM 88-15* shall be considered in the design, including building shape and orientation, zoning of interior spaces for the needs of heating and lighting, daylighting, skylighting, protected entrances, window locations and treatment, shading devices, insulation, and overhangs. Movable night insulation shall be considered for all windows to control heat gain or loss.

b. Unique passive solar applications that are not part of normal design shall be provided only where they are proven to be cost effective and will provide not less than 25 percent of the required space heating or cooling, or 35 percent of the lighting required for the facility. Insolation at the base must exceed an annual daily average of 300 Langleys before solar heating applications can be considered. For daylighting applications, the insolation must not be less than an annual daily average of 200 Langleys.

c. Active solar applications shall be provided only where they are proven to be cost effective and will provide not less than 25 percent of the required space heating or cooling and 35 percent of the domestic water heating on a yearly basis. The design shall optimize the size of the solar system to maximize the ratio of discounted savings to investment.

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Table 4-4:
Artificial Lighting Criteria

Required Light Fixture Key

(1) Adjustable for changing furniture and equipment layouts.
(2) Provided with impact-resistant lens or protective grille.
(3) Ballasted to minimize stroboscopic effects onmoving objects.
(4) Provided with glare-reducing lens.
(5) Provided with moisture-resistant housing.

Recommended Lamp Type Key

(A) Warm white fluorescent
(B) Phosphor coated metal halide
(C) Standard incandescent

E. Electrical Systems

The design shall comply with the standards listed in Table 7-5 as well as satisfy the following general criteria.

1. Power

The facility may potentially be used as an emergency shelter during a disaster and shall be provided with a back-up generator or a receptacle for a mobile generator.

2. Lighting

a. All artificial lighting fixtures shall be capable of independent switching and shall be located to allow for relamping from floor or catwalk surfaces, with the aid of portable ladders or scaffolding if necessary.

b. Light fixture requirements and recommended types, and range of illumination at 3'-0" (.91 m) above the finished floor, are listed in Table 4-4.

	Light Fixture Requirements	*Level of Illumination (Foot Candles)*	*Recommended Lamp Type*
Activity Spaces			
Gymnasium Court	2, 3, & 4	30	C
Handball/Racquetball Courts	2, 3, & 4	30	C
Weight Room	1 & 4	30	A or C
General Exercise Room	1, 2, & 4	30	A or C
Swimming Pool	4 & 5	30	C
Tennis Courts	2, 3, & 4	50	C
Jogging Track	3	30	C
Support Spaces			
Locker Rooms	5	10	A
Shower & Toilet Areas	5	20	A & B
Sauna Rooms	5	10	B
Steam Rooms	5	10	B
Staff Spaces			
Offices	1	50	A
Classroom	1	50	A
Laundry Room	5	30	A
Equipment Issue Room	—	30	A
Public Spaces			
Lobby	1	15	A
Public Toilets	5	20	A
Concession/Vending Area	—	15	A
Juice Bar/Lounge Area	1	15	A
Corridors and Stairs	—	10	A
Mechanical Room	—	15	A

3. Communications

a. A centrally controlled public address and two-way communication system is required.
- At least one public address speaker shall be provided in each room except storage rooms, shower and toilet rooms, saunas, steam rooms, public toilets, and mechanical rooms. A speaker shall be provided for every 800 ft.² (74.3 m²) of net floor area.
- At least one two-way communication station shall be provided at the entrance of every activity, support, and staff space, except for handball/racquetball and squash courts.

b. At least one telephone outlet shall be provided in each staff room. Public telephones shall be provided in the lobby.

c. Television and radio broadcasting outlets shall be provided where these services are anticipated.

F. Specialties and Equipment

Specific specialty and equipment items are listed in the specific criteria for each space. The following items are required in two or more spaces:

1. Spectator Seating

Portable bleachers, telescopic bleachers, or grandstands, shown in Figure 4-1, shall be provided for spectator seating.

a. Portable bleachers are mobile, retractable, and self-supporting seating units not requiring anchorage to either wall or floor. Portable bleachers shall be used in spaces where spectator viewing occurs infrequently and where walls or floors must be clear of obstructions when seating is not in use. Storage is required for portable bleachers when the seating is not in use. Typical seating sections consist of 3 to 8 rows with the maximum number of rows usually limited to 15.

b. Telescopic bleachers are retractable, wall-attached seating units. Telescopic bleachers shall be used in spaces where spectator viewing occurs on a frequent basis, but unobstructed floor space is required when the seating is not in use. The maximum practical number of rows is limited to 30.

c. Grandstands are fixed seating systems. Grandstands shall be used in spaces where spectator viewing occurs on a frequent basis and the seating floor space is not needed otherwise.

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Figure 4-1:
Spectator Seating Systems

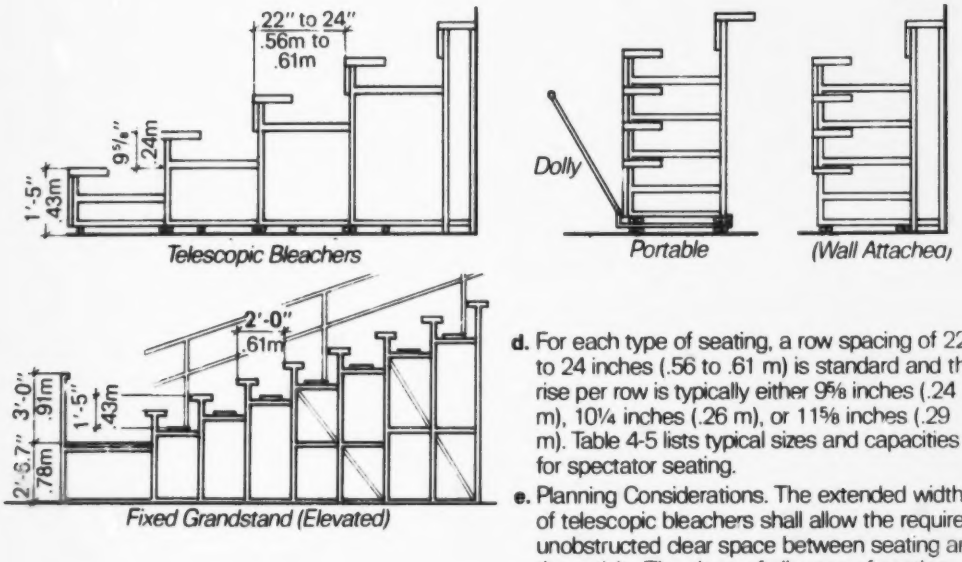

Table 4-5:
Spectator Seating Dimensions

Row Count	Width[1]		Overall Height[2]		Retracted Width[3]		Seat Count[4]
	ft.	m.	ft.	m.	ft.	m.	
5	9'-2"	2.8	4'-8"	1.4	3'-3"	1.0	65
10	19'-2"	5.8	8'-8"	2.6	3'-4"	1.0	130
15	29'-2"	8.9	12'-8"	3.9	3'-5"	1.0	195
20	39'-2"	11.9	16'-8"	5.1	3'-8"	1.1	260
25	49'-2"	15.0	20'-8"	6.3	6'-4"	1.9	325
30	59'-2"	18.0	24'-8"	7.5	6'-7"	2.0	390

1 Based Upon 24" Row Depth (.61m)
2 Based Upon 9⅝" Rise per Row (.24m)
3 Applies to Telescopic Bleachers Only
4 Based Upon 20'0" Wide Section (6.1m)

Table 4-6:
Wrestling Mat Sizes

	Dimensions		Floor Area		Rolled Storage Area	
	ft. x ft.	m x m	ft.²	m²	ft²	m²
Intercollegiate Wrestling Mat	32'-0" x 32'-0"	9.8 x 9.8	1024	96.0	96	8.9
International Wrestling Mat	19'-8" x 19'-8"	6.0 x 6.0	387.6	36.0	59	5.5
Olympic Wrestling Mat	26'-3" x 26'-3"	8.0 x 8.0	689	64.0	79	7.3
Minimum-Sized Boxing Mat	16'-0" x 16'-0"	4.9 x 4.9	256	23.8	48	4.5
Maximum-Sized Boxing Mat	24'-0" x 24'-0"	7.3 x 7.3	576	53.6	72	6.7

d. For each type of seating, a row spacing of 22 to 24 inches (.56 to .61 m) is standard and the rise per row is typically either 9⅝ inches (.24 m), 10¼ inches (.26 m), or 11⅝ inches (.29 m). Table 4-5 lists typical sizes and capacities for spectator seating.

e. Planning Considerations. The extended width of telescopic bleachers shall allow the required unobstructed clear space between seating and the activity. The slope of all types of seating, rise and width, shall provide the sight lines required for full viewing.

2. Wrestling and Boxing Mats

Table 4-6 lists typical dimensions, exercise areas, and stored sizes for wrestling and boxing mats.

3. Floor Exercise Mats

- Width: 6'-0" to 8'-0" (1.8 to 2.4 m).
- Length: In 2'-0" (.61 m) increments to 18'-0" (5.5 m) maximum.
- Storage: Floor exercise mats may be either rolled for storage or hung from wall supports when not in use, or rolled and stored in an area approximately equal to 20 percent of the area of all mats. One dimension of the storage area shall be at least as long as the longest mat roll.

4. Trampoline

- Width: 8'-0" to 10'-0" (2.4 to 3.1 m)
- Length: 12'-6" to 17'-0" (3.8 to 5.2 m)
- Height: 3'-5" (1.0 m)
- Dismantled storage area: 20 ft.² (1.9 m²)

5. Mini-trampoline

- Width: 3'-1" (.94 m)
- Length: 3'-1" (.94 m)
- Height: 1'-8" (.51 m)
- Storage area: 9.5 ft.² (.88 m²)

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A. Functions and Requirements

This chapter describes typical functions and design requirements for each standard space that may be included in the facility. General design criteria from Chapter 4 which may apply to the spaces is not repeated. Although each space is described as a separate and distinct entity, spaces may be more openly arranged to improve staff operations or user participation. In addition, the functions, size of spaces and other requirements may be modified to suit the particular needs of the base.

B. Activity Spaces

Spaces for sports activities and related storage of athletic equipment shall generally form at least 80 percent of the net area of the facility and at least 60 percent of the total gross area.

Table 5-1:
Various Sport Court Sizes

	Dimensions	*Min Clear Height*
Basketball Court	94'-0" x 50'-0" (14.0 x 26.0m)	24'-0" (7.0m)
Tennis Court	36'-0" x 78'-0" (11.0 x 23.8m)	34'-0" (10.4m)†
		20'-0" (6.1m)††
Volleyball Court	30'-0" x 60'-0" (9.1 x 18.3m)	30'-0" (9.1m)
Badminton Court	20'-0" x 44"-0' (6.1 x 13.4m)	25'-0" (7.6m)

†at net
††at base line

1. Gymnasium Court

a. The court is primarily used for spectator and non-spectator sports, entertainment events, and assemblies. Athletic activities that shall be provided include basketball (both practice and competition), volleyball, badminton, jogging, and tennis (practice only). Co-use athletic activities that may also be provided include boxing, general exercise, judo, karate, and wrestling.

b. Circulation and Adjacency Considerations. Figure 5-1 shows a typical layout and circulation arrangement for a gymnasium court and its adjacent spaces.

- The court shall be readily accessible from the lobby, all the support spaces, and the equipment issue room.
- A secure equipment storage area for nets, standards, and exercise mats shall be adjacent to the court area.
- Controlled access is required from the court to outdoor athletic activity areas.
- Direct visual monitoring of this area shall be provided from the staff offices.

c. Size and Occupant Load. The type and number of activities and the number of spectators will establish the size of the space.

- The regulation sizes of the individual activities for a gymnasium court are listed in Table 5-1.

Figure 5-1:
Gymnasium Court Layout

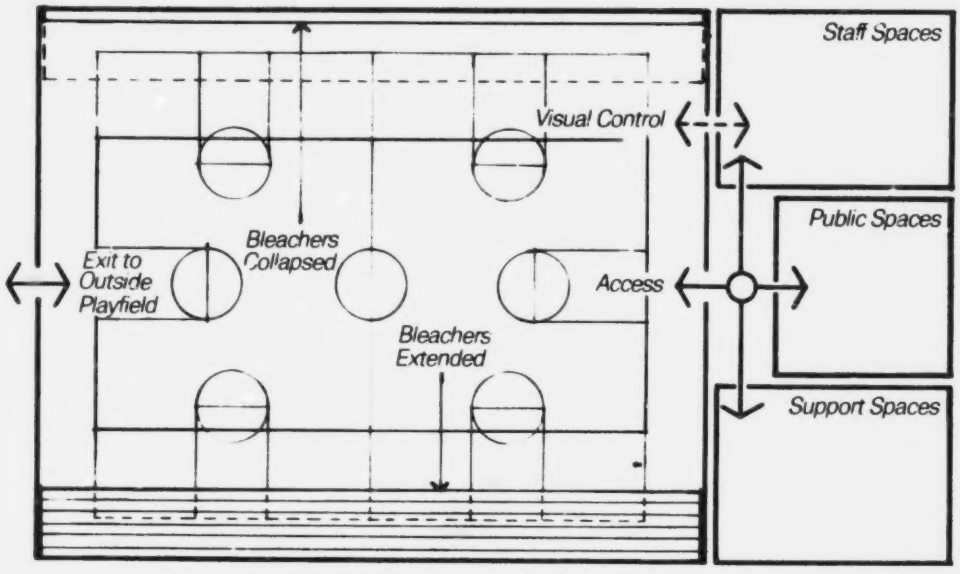

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Table 5-2:
Estimated Number of Spectators

Minimum	Maximum
0	Gymnasium 600
300	Field House 1200
300	Indoor Sports Complex 1200

Table 5-3:
Basketball Court Sizes

Spectator Count	Floor Area for Court w/ 3'-0" (1.0m) Perimeter§ ft.²	m²
0	5,800	540
300	6,800	630
600	7,800	725
900	—	—
1200	—	—

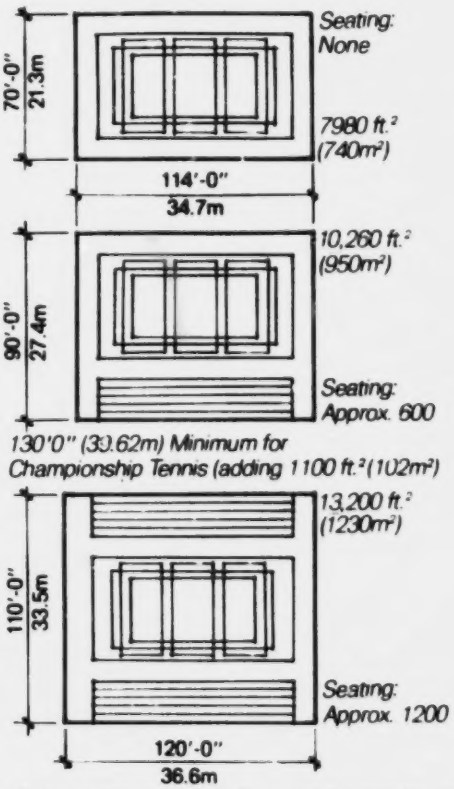
Spectator Count	Floor Area for Court w/ 6'-0" (2.0m) Perimeter§ ft.²	m²
0	6,770	630
300	7,830	730
600	8,890	825
900	9,950	952
1200	11,000	1,020

Spectator Count	Floor Area for Court w/ 10'-0" (3.0m) Perimeter§ ft.²	m²
0	8,180	760
300	9,320	865
600	10,460	970
900	11,600	1,074
1200	12,740	1,185

§Includes 200 ft.² of floor area for storage

Figure 5-2:
Gymnasium Court Sizes ▷

- The following unobstructed perimeter dimensions shall be provided between the edge of a court and an adjacent court, a wall, or another activity:
  - Basketball: 3'-0" to 10'-0" (1.0 to 3.0m)
  - Tennis: 12'-0" (3.65m)
  - Volleyball: 6'-0" (2.0 m) at ends, and 5'-0" (1.5 m) at sides.
  - Badminton: 5'-0" (1.5 m)
- 3.3 to 3.8 ft.² (.31 to .35 m²) of floor area shall be provided for each spectator. Wall mounted retractable seating shall be provided for spectators as listed in Table 5-2.
- At least 200 ft.² (18.5 m²) of the gymnasium court enclosure shall be provided for storage of athletic equipment.
- The floor area of a gymnasium court enclosure varies as listed in Table 5-3 and as shown in Figure 5-2.

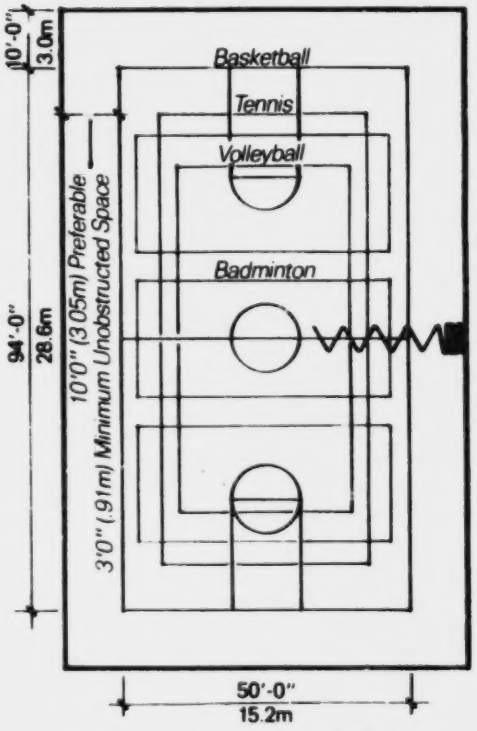


All Areas Given Exclude Required Storage Space

d. Equipment and Furnishings.
- Scoreboard with floor outlets at scoring table locations
- 2 clocks
- 6 retractable basketball backboards
- Nets and standards for volleyball, badminton, and tennis
- Floor inserts for nets
- Demountable wainscot padding.
- Divider curtains (optional)
- Exercise floor mats (optional)
- Portable scoring table with chairs (optional)

e. Materials and Finishes.
- Floor: Wood strip or synthetic rubber.
- Base: Glazed, ceramic, or rubber tile.
- Wainscot: Glazed or ceramic tile.
- Walls: Painted masonry.
- Ceiling: Exposed structure.

f. Special Environmental Considerations. Mechanical units and registers shall be located outside the clear dimensions of the activity to avoid air movement influencing athletic play.



Minimum Court Enclosure = 5600 ft.²

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2. Handball/Racquetball and Squash Courts

a. Use. These courts shall be used for both singles and doubles competition, with spectator viewing for at least one court.

b. Circulation and Adjacency Considerations.
- These courts shall be readily accessible from all support spaces.
- Direct access to the spectator viewing areas is required from the primary entrance.

c. Size. The number and type of courts, and the number of spectators, will establish the size of the space.
- 3.3 to 5 ft.² (.31 to .46 m²) of floor area shall be provided for each spectator at viewing areas. Portable retractable seating shall be provided for at least 30 spectators as shown in Figure 5-3.
- The regulation size of a handball/racquetball court, shown in Figure 5-4, is 800 ft.² (74.3 m²), 20′-0″ (6.10 m) wide, and 40′-0″ (12.19 m) long, with 20′-0″ (6.10 m) ceiling height.
- The regulation size of a squash court, shown in Figure 5-4, is 592 ft.² (55.0 m²), 18′-6″ (5.64 m) wide, and 32′-0″ (9.76 m) long, with 18′-0″ (5.49 m) ceiling height.

d. Materials and Finishes.
- Floor: Wood strip.
- Walls: Plastic laminate panel. Back walls in handball/racquetball courts may be safety glass for spectator viewing.
- Ceiling: Plastic laminate panel.

e. Special Planning Considerations.
- Multiple courts shall be grouped for economy of structure.
- Small recessed storage compartments are required for storage of personal effects. If accessible from the court, these compartments shall have flush doors and hardware.

f. Special Environmental Considerations. Air supply and return registers in the courts shall have flat exposed surfaces, and be located either in the back half of the ceiling or the upper 8′-0″ (2.44 m) of the back wall.

Figure 5-3:
Walled Court Layouts

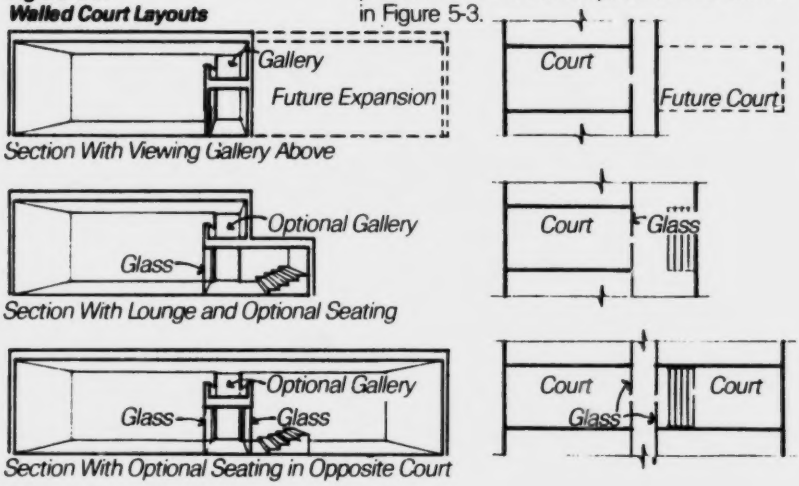
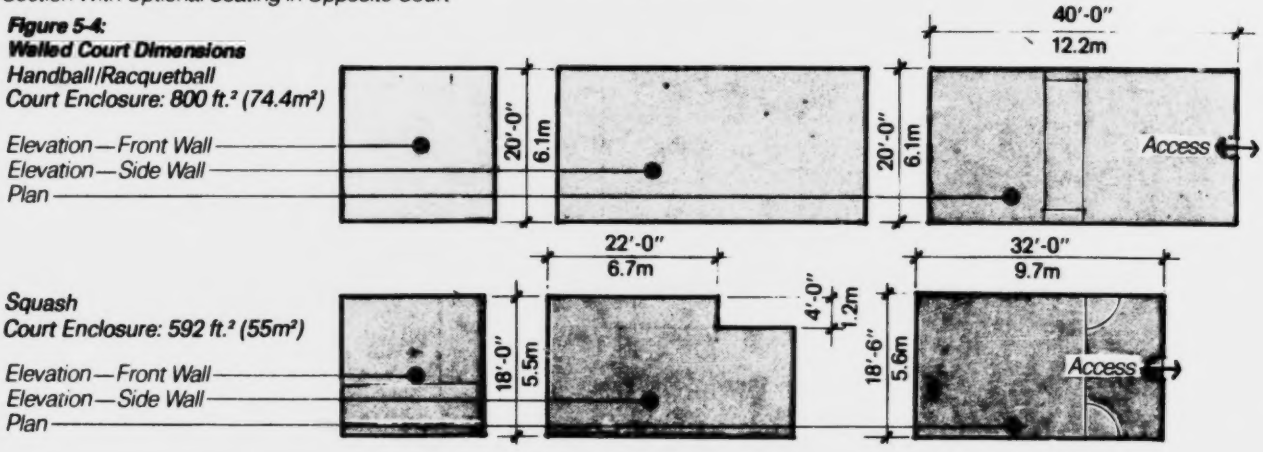


Figure 5-4:
Walled Court Dimensions



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3. Weight Room.

a. Use. This space is primarily used for body building, individual weight training, and fitness exercises. Co-use activities that may also be provided include general exercise and classes.

b. Circulation and Adjacency Considerations.
- The weight room shall be readily accessible from the gymnasium court and all support areas.
- A secure equipment storage area shall be included adjacent to the athletic area.

Figure 5-5:
Weight Room Layout

A = Movable Equipment: Varies from 305-ft.² to 530 ft.² (28.3m² to 49.2m²)
B = Fixed Multi-Use Gymnasium Machine: 320 ft.² (29.7m²)
Fixed Individual Gymnasium Machine: 800 ft.² (74.3m²)
Fixed Chest Pulley Weights: 35 ft.² (3.3m²)
C = General Workout Area: 0 to 225 ft.² (0 to 20.9m²)

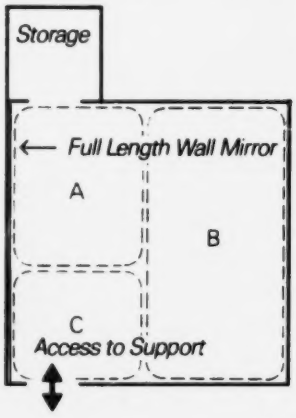

Table 5-4:
Body Building Equipment Criteria

	Area Required For Activity ft.²	m²	Movable or Fixed
Barbell Set and Rack	80	7.4	M
Dumbell Set and Rack	50	4.6	M
Exercise Bicycle	25	2.3	M
Multi-Use Gym Machine	320	29.7	F
Individual Gym Machine	800	74.3	F
Flat Bench	40	3.7	M
Inclined Bench	35	3.3	M
Chest Pulley Weights	35	3.3	F
Supine Bench	40	3.7	M
Arm Ladder	10	0.9	M
Instruction Platform	225	20.9	M or F
Speed Ball, Punching Bags	25	2.3	M
Heavy Punching Bag	25	2.3	M
Chinning Bar	10	0.9	M
Roman Chair	40	3.7	M

Note: The individual gymnasium set includes 18 machines, one each for duo hip and back, leg extension, leg curl, hip abductor, hip adductor, super duo squat, super pullover, torso arm, rowing torso, double chest, lateral raise, overhead press, rotary torso, abdominal, lower back, multi-exercise, multi-biceps, and multi-triceps.

c. Size. The number and types of bodybuilding equipment, extent of co-use activities, and number of spectators, where applicable, will establish the size of the space.
- Typical floor area for each room is 800 to 2000 ft.² (74.3 to 185.8 m²), including the athletic area, storage, and spectator viewing. The athletic area shall provide 40 to 50 ft.² (3.7 to 4.7 m²) for each user. This area shall accommodate the activity areas shown in Figure 5-5 required for each item of body building equipment. This area shall also include at least 225 ft.² (20.9 m²) for a workout area if a general exercise room is not provided. At least 10 percent of the total area shall be used for storage of equipment and supplies.
- The ceiling height shall be 9'-0" (2.74 m) min.
- 3.3 to 5 ft.² (0.31 to 0.46 m²) shall be provided for each spectator in viewing areas. Portable retractable seating shall be provided for at least 30 spectators.

d. Furnishings and Equipment.
- Furnishings:
  - Full length wall mirrors
  - Exercise mats
  - 2 clocks for each room
  - Wall protection screen (optional)
  - Portable chalkboard or tackboard (optional)
  - Divider curtains (optional)
- Body building equipment. The equipment items listed in Table 5-4 are optional, but a typical weight room will include a multi-use gymnasium machine or a set of individual gymnasium machines, and many of the other items.

e. Materials and Finishes.
- Floor: Synthetic rubber or wood with removable protective mats.
- Base: Glazed, ceramic, or rubber tile.
- Wainscot: Glazed or ceramic tile.
- Walls: Painted masonry.
- Ceiling: Acoustical, exposed structure, or painted gypsum board.

f. Special Planning Requirements. The structural floor shall be designed to reduce noise transmission caused by dropping weights, and shall accommodate the additional live and impact loads of the body building equipment.
- Males and females can use this space simultaneously. However, dividers should be provided for occasional use.

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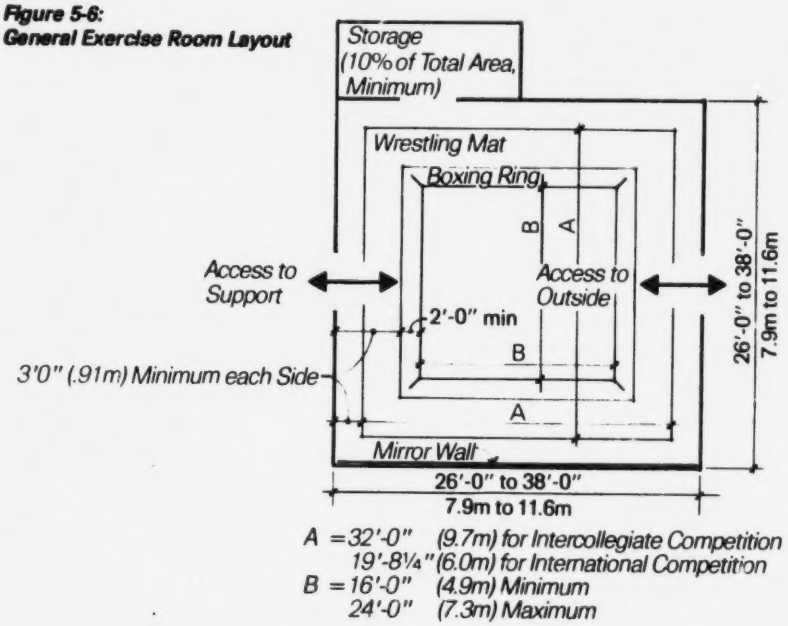
Figure 5-6:
General Exercise Room Layout



4. General Exercise Room

a. Use. This space is primarily used for fitness exercises and aerobic dancing. Optional co-use activities include badminton, boxing, wrestling, and classes. Spectator viewing of the activities may also be provided.

b. Circulation and Adjacency Considerations. Figure 5-6 shows a typical layout and circulation arrangement for a general exercise room.
- The general exercise room shall be readily accessible to both the gymnasium court and the support spaces.
- Controlled access shall be provided from this space to outdoor athletic areas.
- A secure equipment storage area is required adjacent to this space.

c. Size. The number of rooms, the type and extent of co-use activities, and the number of spectators will establish the size of the space.
- Typical floor area for each room is 800 to 1600 ft.² (74.3 to 148.6 m²), including the athletic area, spectator viewing, and storage.
  - The athletic area shall provide 40 to 50 ft.² (3.7 to 4.7 m²) for each user.
  - 3.3 to 5 ft.² (0.31 to 0.46 m²) shall be provided for each spectator in viewing areas. Portable retractable seating shall be provided for at least 30 spectators.
  - At least 10 percent of the total area shall be used for storage of equipment and supplies.
- The ceiling height shall be at least 12'-0" (3.66 m) for fitness exercises and aerobic dancing and 24'-0" (7.2 m) for badminton and gymnastics.

d. Furnishings.
- Wall mirrors
- Exercise mats
- Wall projection screen (optional)
- Portable chalkboard (optional)
- Divider curtains (optional)
- Floor and wall inserts for nets (optional)
- Ballet barre (optional)

e. Materials and Finishes.
- Floor: Synthetic rubber or wood with removable protective mats.
- Base: Glazed or ceramic tile.
- Wainscot: Glazed or ceramic tile.
- Walls: Painted masonry.
- Ceiling: Acoustical, exposed structure.

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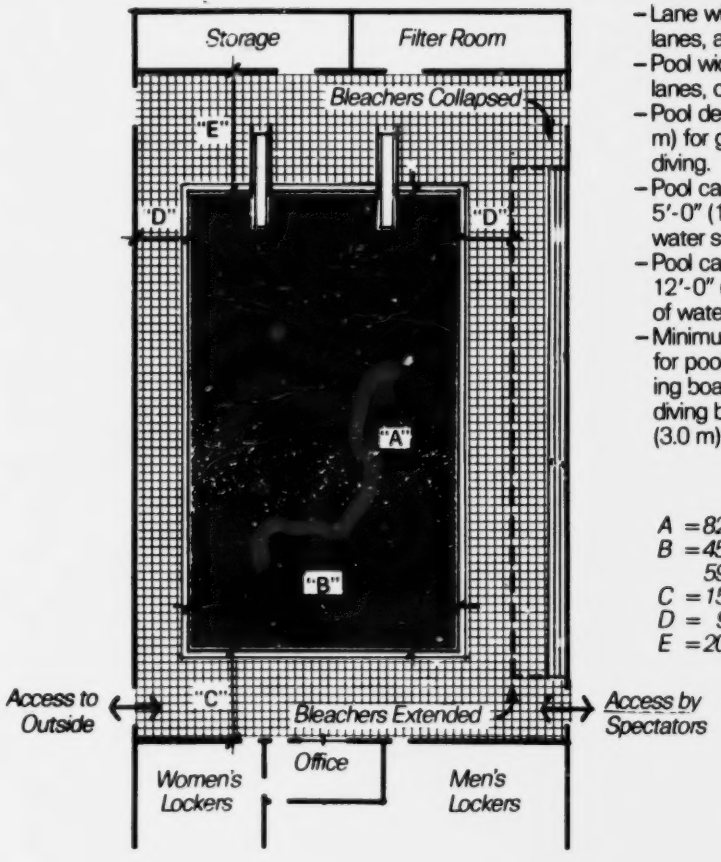
5. Swimming Pool

The following information is a checklist for the preliminary planning of an indoor swimming pool for a field house or an indoor sports complex. Additional requirements for construction, materials, finishes, equipment, furnishings, and the pool hydraulic and filtering systems are found in the Air Force Design Guide for Swimming Pools.

a. Use. The pool is used for a wide range of aquatic activities including instructional programs, competitive events, individual fitness, and recreational activities.

b. Circulation and Adjacency Considerations. Figure 5-7 shows a typical layout and circulation arrangement for a swimming pool and its adjacent spaces.

Figure 5-7:
Indoor Swimming Pool Layout



- Direct access is required from the pool deck to the support spaces.
- A separate equipment storage room shall be adjacent to the pool deck.
- Controlled access shall be provided from this space to the outdoors, such as to an adjacent sun deck.
- Visual monitoring of the pool area is required from a staff office.
- Access to spectator viewing areas shall be monitored and separated from the participant's access to the swimming pool.

c. Size. The following factors will establish the overall size of the space.

- Pool Size and Occupant Load:
  - Pool length shall be 82'-2" (25.0 m) or 164'-4" (50.0 m).
  - Lane widths shall be 7'-0" (2.5 m) for interior lanes, and 8'-6" (3.0 m) for outside lanes.
  - Pool width shall be 45'-0" (16.0 m) for 6 lanes, or 59'-0" (21.0 m) for 8 lanes.
  - Pool depth shall be 3'-6" to 5'-0" (1.0 to 1.5 m) for general use, and 12'-0" (3.5 m) for diving.
  - Pool capacity for water depths of 3'-6" to 5'-0" (1.0 to 1.5 m) shall be 15 ft.² (1.4 m²) of water surface area for each person.
  - Pool capacity for water depths of 5'-0" to 12'-0" (1.5 to 3.5 m) shall be 25 ft.² (2.35 m²) of water surface area for each person.
  - Minimum ceiling heights above water surface for pools shall be 16'-6" (5.0 m) without diving boards, 19'-9" (6.0 m) with 3'-3" (1.0 m) diving boards, and 26'-4" (8.0 m) with 9'-9" (3.0 m) diving boards.

A = 82'-2" (25.0m) or 164'-4" (50.0m)
B = 45'-0" (16.0m) for 6 Lanes
59'-0" (21.0m) for 8 Lanes
C = 15'-0" (4.6m) Minimum Clear
D = 9'-0" (2.7m) Minimum Clear
E = 20'-0" (6.1m) Where Diving Is Provided

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Table 5-5:
Number of Pool Spectators

	Minimum	*Maximum*
25 Meter Pool	0	300
50 Meter Pool	300	600

Table 5-6:
Mechanical Room Sizes

	Size of Room	
Size of Pool	ft.²	m²
6 lane, 25m Pool	350	32.5
8 lane, 25m Pool	400	37.2
6 lane, 50m Pool	700	65.0
8 lane, 50m Pool	800	74.4

- Deck Size and Occupant Load:
  - Minimum clear width shall be 9′-0″ (2.75 m) at sides, 15′-0″ (4.6 m) at the shallow end, and 20′-0″ (6.1 m) at the diving end.
  - 3.3 to 5 ft.² (.31 to .46 m²) of additional deck area shall be provided for each spectator at viewing areas. Portable retractable seating shall be provided as listed in Table 5-5.
- Pool storage. Floor area equal to at least 5 percent of the total deck area shall be provided for the storage of maintenance equipment and supplies.
- Mechanical room. Floor area shall be provided as listed in Table 5-6 for the filter and chlorine storage room.
- Pool Enclosures. Sizes of pool enclosures are listed in Table 5-7.
  - For Pool Enclosures Providing Diving: With diving depth included in the swimming area, no additional area shall be added to the enclosure area for a general use pool. With a separate diving area, 1280 ft.² (119 m²) shall be added to the water area and 1180 ft.² (109 m²) shall be added to the deck area. The total enclosure is increased by 2460 ft.² (229 m²) for a separate diving area.

d. Special Environmental Considerations.
- The design of the enclosure shall provide an acoustical reverberation time of between 2.0 and 3.0 seconds, to minimize echo sounds.
- Windows, skylights, and clerestories shall be protected from direct exposure to the sun, to avoid reflected glare from the water surface.
- The water temperature shall be not more than 8°F below or 2°F above the air temperature.

Table 5-7:
Pool Enclosure Sizes

	25m Pool 6 lanes with no spectators		*25m Pool 6 lanes with 300 spectators*		*25m Pool 8 lanes with no spectators*		*25m Pool 8 lanes with 300 spectators*		*50m Pool 6 lanes with no spectators*		*50m Pool 6 lanes with 300 spectators*		*50m Pool 8 lanes with no spectators*		*50m Pool 8 lanes with 300 spectators*	
	ft.²	m²	ft.²	m²	ft.²	m²	ft.²	m²	ft.²	m²	ft.²	m²	ft.²	m²	ft.²	m²
Water	3,696	400	3,696	400	4,846	525	4,846	525	7,395	800	7,395	800	9,695	1,050	9,695	1,050
Deck	3,368	313	3,368	313	3,786	358	3,786	352	4,848	473	4,848	473	5,268	519	5,268	519
Viewing	0	0	1,000	93	0	0	1,000	93	0	0	1,000	93	0	0	1,000	93
Storage	336	31	336	31	378	35	378	35	485	47	485	47	527	52	527	52
Mechanic	350	32	350	32	400	37	400	37	700	65	700	65	800	74	800	74
Net Total	**7,750**	**777**	**8,750**	**871**	**9,410**	**950**	**10,410**	**1,043**	**13,428**	**1,385**	**14,428**	**1,478**	**16,290**	**1,695**	**17,290**	**1,788**

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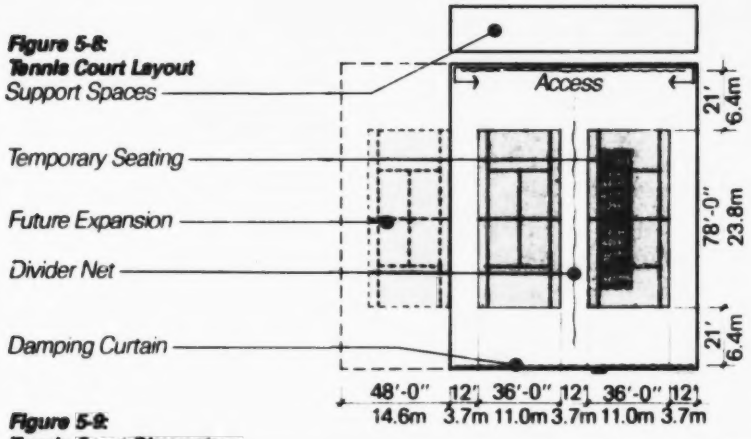


Figure 5-8:
Tennis Court Layout

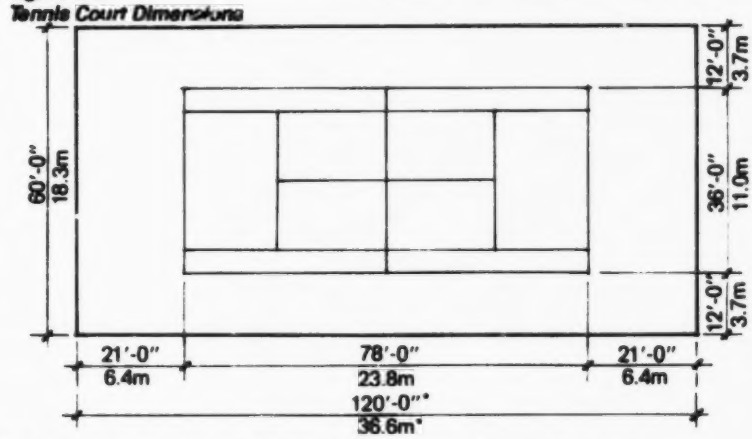
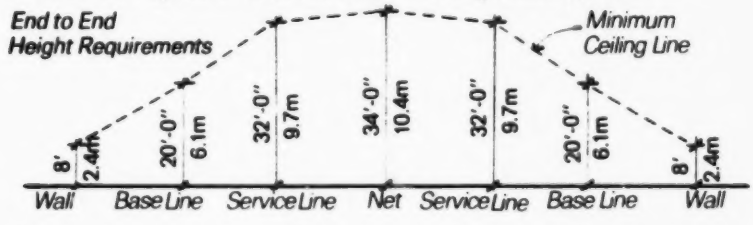
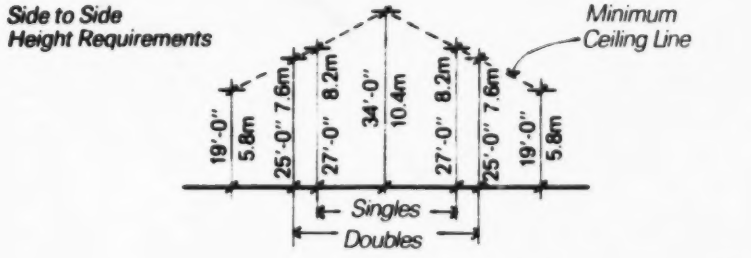


Figure 5-9:
Tennis Court Dimensions

*Minimum for Play 130'0" (39.62m) where Line Judges are Required





6. Tennis Courts

a. Use. The courts shall be designed for both singles and doubles competition, with spectator viewing for at least one court.

b. Circulation and Adjacency Considerations. Figure 5-8 shows a typical layout and circulation arrangement for a tennis court and its adjacent spaces.
- The courts shall be readily accessible to all support spaces, and the equipment is room.
- An equipment storage area shall be provided adjacent to the courts.
- Access from this space shall be provided to adjacent outdoor tennis courts, if any.
- Spectator viewing may be provided from elevated lounge areas.
- Spectator access to viewing areas shall be monitored from staff offices.

c. Size. The number of courts establish the size of the space.
- The regulation size of a tennis court, shown in Figure 5-9, is 4320 ft.² (401.3 m²), 36'-0" (10.97 m) wide and 120'-0" (36.58 m) long for championship play.
- At least 12'-0" (3.65 m) shall be provided between the side of a court and an adjacent court, a wall, or another activity. An additional 4'-0" (1.22 m) shall be provided at one end of the court for circulation.
- 3.3 to 5 ft.² (.31 to .46 m²) of floor area shall be provided for each spectator at viewing areas. Portable retractable seating shall be provided for at least 150 spectators.
- For each court, 50 ft.² (4.65 m²) of floor area shall be provided for storage of practice balls, automatic ball servers, and net maintenance supplies.
- The total floor area for a tennis court enclosure including storage and spectator viewing for 150 persons vary as follows:
  - 1 court: 7,980 ft.² (741 m²)
  - 2 courts: 13,992 ft.² (1300 m²)
  - 3 courts: 19,994 ft.² 1857 m²)
  - 4 courts: 25,996 ft.² (2415 m²)

d. Furnishings and Equipment.
- Divider curtains between courts
- Floor inserts for nets
- Padded wainscot

e. Materials and Finishes.
- Floor: Synthetic rubber with court markings.
- Walls: Painted masonry, padded wainscot.
- Ceiling: Exposed structure.

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7. Jogging Track

a. Use. The track is primarily used for indoor jogging during inclement weather.

b. Circulation and Adjacency Considerations. Figure 5-10 shows a typical layout and circulation arrangement for a jogging track.
- The jogging track shall be readily accessible to all support spaces.
- Direct access shall be provided from this track to outdoor athletic areas and jogging trails.

c. Size. The number of lanes and the number of laps per mile establish the size of the space.
- Typical floor area for a 3-lane track is between 2430 to 2800 ft.² (223 to 260 m²).
  - Each lane width shall be 2′-6″ (.76 m). At least 3 lanes shall be provided for each track, and the number of laps per mile shall be at least 15 and no more than 17.
- The ceiling height shall be 9′-0″ (2.75 m) min.

d. Furnishings and Equipment. The track area can share the furnishings of the adjacent activity space it surrounds, such as clocks and retractable bleacher seating. A padded wainscot shall be provided where the track abuts barriers.

e. Materials and Finishes
- Floor: Hardwood strip or synthetic rubber with lane markings.
- Walls: Painted masonry with padded wainscot.
- Ceiling: Exposed structure.

f. Special Planning Considerations.
- The track may either be on grade or elevated and may encircle either the gymnasium court, general exercise room, or tennis courts. Elevated tracks have the advantage of being able to be sloped at the turns, and they have less impact to activity below.
- Cross traffic between joggers and other participants shall be minimized to avoid collisions.
- Doors leading directly to the track area shall be recessed at least 3′-0″ (.91 m).

Figure 5-10:
Jogging Track Layout

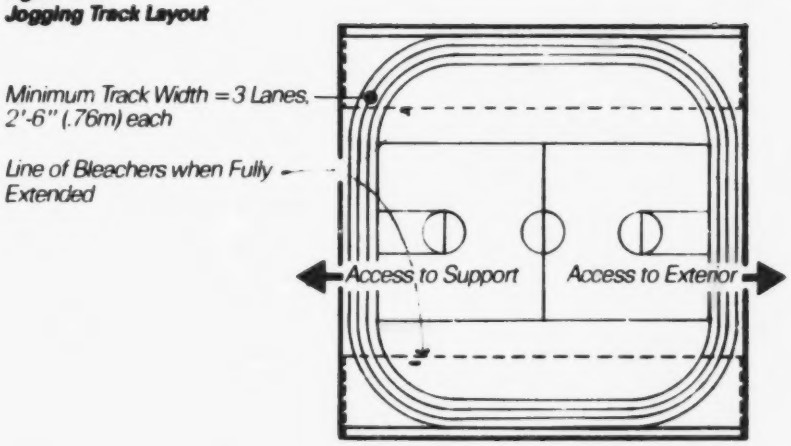

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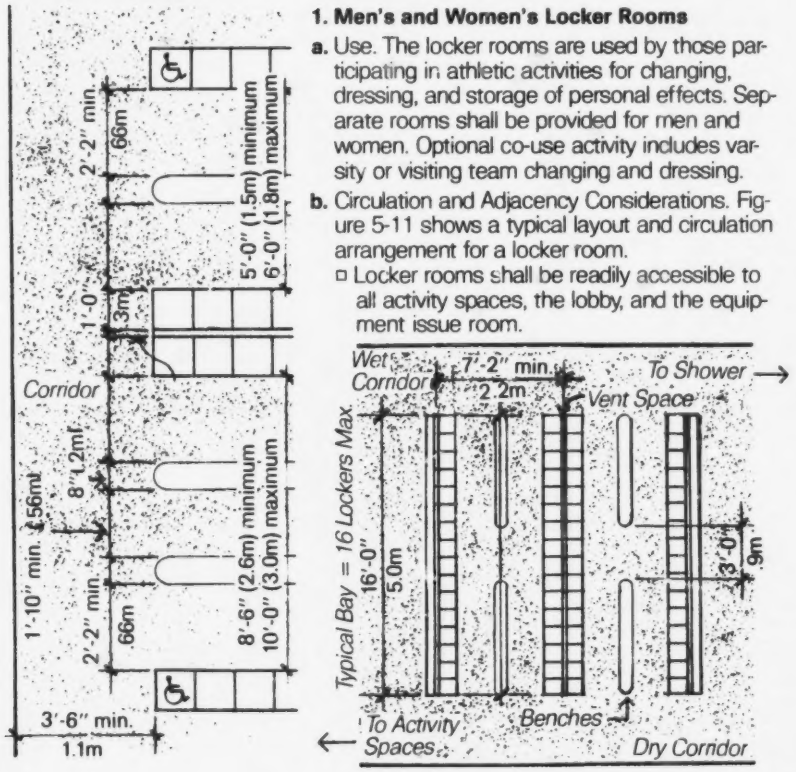
Figure 5-11:
Locker Room Layout



C. Support Spaces

These spaces for the convenience and general health of the sports participants shall generally form no more than 16 percent of the net area of the facility and no more than 12 percent of the total gross area.

1. Men's and Women's Locker Rooms

a. Use. The locker rooms are used by those participating in athletic activities for changing, dressing, and storage of personal effects. Separate rooms shall be provided for men and women. Optional co-use activity includes varsity or visiting team changing and dressing.

b. Circulation and Adjacency Considerations. Figure 5-11 shows a typical layout and circulation arrangement for a locker room.

- Locker rooms shall be readily accessible to all activity spaces, the lobby, and the equipment issue room.
- Locker rooms shall have direct access to the sauna, steam room, and shower and toilet areas.

c. Size. The number of participants, the type of locker system selected, and the need for any special areas for varsity or visiting teams, establish the size of the space. The following guidelines are for a typical base and shall be used unless local circumstances dictate otherwise.

- Locker units shall generally be provided for 15 to 25 percent of the active duty military population, but not for more than two times the user capacity of all activity space the facility.
- 80-90% of locker units shall be for men.
- 10-20% of locker units shall be for women.
- Approximately 5 ft.² (.45 m²) of floor area shall be provided for each 1'-0" x 1'-0" (.3 x .3 m) locker tier for 1, 2 or 6 locker units.
- 1, 2 or 6 tier lockers shall be provided as follows to satisfy the storage requirements of the user. In cold climates where heavy clothing is routinely stored, all units may be 1 tier lockers. Typically, in mild climates, the lockers shall be provided as follows:
  - 1 tier: Approximately 10% of the tiers (4 to 5% of the locker units)
  - 2 tier: Approximately 80% of the tiers (65 to 70% of the locker units)
  - 6 tier: Approximately 10% of the tiers (25 to 30% of the locker units)
- Typical floor area ranges from 600 to 3000 ft.² (55.7 to 278.7 m²) for all locker rooms of a facility, using about 2.2 ft.² (.20 m²) for each locker unit based on the mix of 1, 2 and 6 tier lockers.
- The ceiling height shall be 9'-0" (2.75 m) min.

d. Furnishings.

- Fixed benches, 16" (.38 m) high
- Full length mirrors
- Bulletin board
- Divider curtains or partition (optional)
- Open clothes hanging rods or racks for the 6 tier lockers and for approximately 10 percent of the remaining locker units.

e. Equipment. Locker units shall be provided in the following sizes:

- 1 tier: 12" x 12" x 72" high (.3 x .3 x 1.8 m)
- 2 tier: 12" x 12" x 36" high (.3 x .3 x .9 m)
- 6 tier: 12" x 12" x 12" high (.3 x .3 x .3 m)

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f. Materials and Finishes.
- Floor: Resilient tile in dry areas, and ceramic tile or synthetic rubber in wet areas.
- Base: Resilient tile; ceramic tile in wet areas.
- Walls: Painted masonry, ceramic, or glazed tile.
- Ceiling: Acoustical or painted gypsum board.

g. Special Planning Considerations.
- Each locker room shall include both a wet and dry corridor system.
- Each locker room area shall be subdividable to allow for varsity or visiting teams.

h. Special Environmental Considerations. Exhaust and ventilation systems shall be provided to minimize odors and high humidity levels in this area. To improve air movement, ceiling fans may be considered.

Figure 5-12:
Shower Room Layout

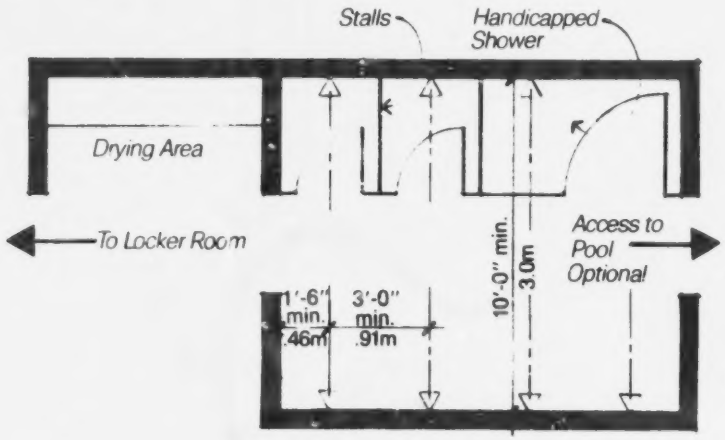

Table 5-8:
Fixture Requirements for Shower and Toilet Rooms

	Fixtures per Number of Men	Fixtures per Number of Women	Floor Area Required for Each Fixture	
			ft.²	m²
Water Closet	1/30	1/30	25	2.32
Lavatory	1/25	1/25	15	1.40
Urinal	1/40	—	15	1.40
Drinking Fountain	1/100	1/100	15	1.40
Shower (2 minimum)	1/15	1/15	15	1.40
Handicapped W.C.	1 min.	1 min.	30	2.79
Handicapped Shower	1 min.	1 min.	30	2.79

Note: For each shower room, provide a drying area of at least 25 ft.² (2.32m²) or 3 ft.² (0.28m²) for each shower.

2. Shower and Toilet Rooms

a. Use. These rooms are used by participants, before and after athletic activities. Separate rooms shall be provided for men and women.

b. Circulation and Adjacency Considerations. Figure 5-12 shows a typical layout and circulation arrangement for a shower room.
- For each sex, direct access is required from the shower area to the locker room.
- If a pool is provided, direct access is required from the shower areas to the pool deck.
- For each sex, the toilet area shall be adjacent to the locker room.

c. Size. The size of these rooms is based on the user capacity of the facility as calculated for the locker spaces. Generally, the number of men and women served by the shower and toilet rooms will be one half of the number of locker units. The same ratio of men and women provided for in locker spaces shall be used to determine shower and toilet room sizes for each sex.
- Fixture requirements and room size shall be determined by using Table 5-8.
- Typical floor area ranges from 500 to 2000 ft.² (46.5 to 139.3 m²) for all shower and toilet rooms of a facility.
- Ceiling height shall be at least 9'-0" (2.75 m).

d. Furnishings and Equipment. *AFM 88-8*, Chapter 8, and *AFM 88-15*, Chapter 4, prescribe the specific toilet and shower room fixture and accessory requirements.

e. Materials and Finishes.
- Floor: Ceramic tile.
- Base: Glazed or ceramic tile.
- Wainscot: Glazed or ceramic tile.
- Walls: Painted masonry, moisture-resistant gypsum board, portland cement plaster, or high strength gypsum plaster.
- Ceiling: Painted Keene's cement plaster, portland cement plaster, high strength gypsum plaster, or moisture-resistant gypsum board.

f. Special Planning Considerations.
- Male shower rooms shall be furnished with column- or wall-mounted shower heads.
- Female shower rooms shall be furnished with individual stalls.
- Access from locker and shower areas to lavatories shall be through a dry corridor or area.

g. Special Environmental Considerations. A separate exhaust system shall be provided for the toilet areas.

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3. Sauna and Steam Rooms

a. Use. These rooms are primarily used for relaxation and for the beneficial effects of heat on the body.

b. Circulation and Adjacency Considerations. Figure 5-13 shows a typical layout and circulation arrangement for a sauna and steam room.
- These rooms shall have direct access to the locker and shower areas.
- These rooms shall be adjacent to each other and share a common cool down area.

c. Size. The number of occupants to be accommodated will establish the size of these rooms. Each room shall accommodate not more than 5 percent of the user capacity of the corresponding toilet and shower room, but not less than 4 occupants.
- The rooms shall provide 8 to 10 ft.² (.74 to .93 m²) of floor area for each occupant.
- The cool down area shall be approximately 50 percent of the sauna room size.
- The floor area of each room and its related cool down area, shall range from 40 to 300 ft.² (3.7 to 27.9 m²) for 4 to 30 occupants.
- The ceiling height in a sauna room shall be 4′-0″ (1.25 m) above the highest bench and at least 9′-0″ (2.75 m) overall.
- The ceiling height in a steam room shall be 9′-0″ (2.75 m).

d. Furnishings and Equipment.
- Tamperproof temperature control
- Thermometer and hydrometer
- Door with vision glass & panic bar hardware
- Light with exterior switch
- Temperature and panic alarms with audible monitors in control area
- Wood benches with recessed nailhead to accommodate either sitting or reclining (sauna only)
- Electric heater with guard rails (sauna only)
- Tile benches for sitting (steam room only)
- Clock visible through vision panel of door (optional)

e. Materials and Finishes.
- Sauna Rooms:
  - Cedar or redwood slats that can be removed for cleaning and maintenance of subfloor.
  - Walls and ceiling: Cedar or redwood tongue and groove paneling.
- Steam rooms:
  - Floors: Ceramic tile.
  - Walls: Ceramic or glazed tile.
  - Ceiling: Painted moisture-resistant gypsum board, Keene's cement plaster, portland cement plaster, or high strength gypsum plaster.

f. Special Planning Considerations. Separate rooms shall be provided for men and women.

g. Special Environmental Considerations. A 208/240 volt power source shall be provided for steam generators or electric heaters.

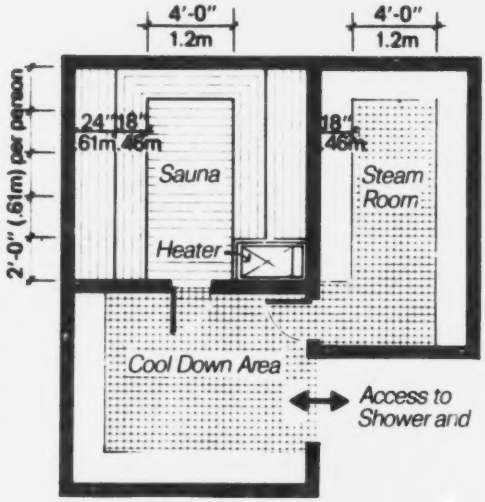

Figure 5-13:
Sauna, Steam Room, and Cool Down Area Layout

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D. Staff Spaces

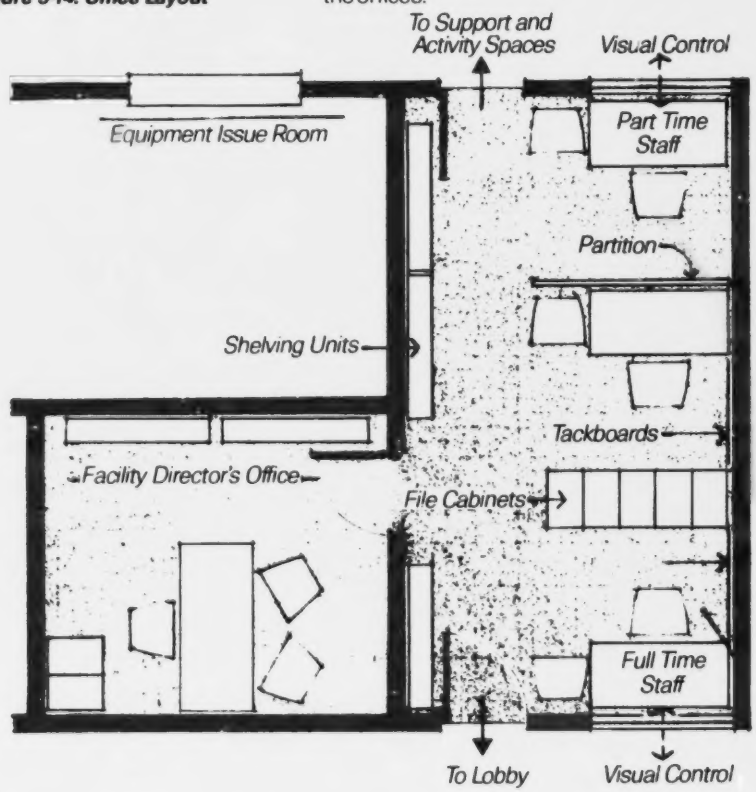
These spaces for management and service uses by staff personnel shall generally form no more than 4 percent of the net area of the facility and no more than 3 percent of the total gross area.

1. Offices

a. Use. The offices are used by the facility's director, the sports and recreational activities program staff, and the clerical support personnel for facility business.

b. Circulation and Adjacency Considerations. Figure 5-14 shows a typical layout and circulation arrangement for the staff spaces.
- The offices shall be adjacent to each other, to the lobby, and to the equipment issue room, and be readily accessible to activity and support spaces.
- Visual monitoring of the access points to all activity and support spaces is required from the offices.

Figure 5-14: Office Layout



c. Size and Occupant Loads. The number of staff will establish the size and number of offices.
- 120 ft.² (11.1 m²) of floor area shall be provided for the facility director's office.
- 100 ft.² (9.3 m²) of floor area shall be provided for each other full time staff member.
- 50 ft.² (4.6 m²) of floor area shall be provided for each part time staff member.
- Typical floor area for all offices is 200 to 500 ft.² (18.6 to 46.5 m²).
- The ceiling height shall be 9'-0" (2.75 m) min.

d. Furnishings and Equipment.
- One desk, one desk chair, one side chair, and two file cabinets for each full time staff member
- Shelving units
- Room dividers (optional)
- Tackboards (optional)

e. Materials and Finishes.
- Floor: Carpet or resilient tile.
- Base: Resilient tile.
- Walls: Painted masonry, or painted or vinyl covered gypsum board.
- Ceiling: Acoustical or painted gypsum board.

f. Special Planning Requirements. More than one office area may be required in large facilities having a gymnasium court and a swimming pool and/or tennis courts. In each case, a minimum of one office shall be located adjacent to each major activity space to allow for visual control or monitoring of each major activity space. The facility director's office shall be separate from the control and monitoring offices.

g. Special Considerations. The central controls for the public address and lighting systems shall be located in the equipment issue area.

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2. Classroom

a. Use. The classroom is used primarily for the instruction of athletic and first aid training. The space may be also used for emergency care of injured athletes when the facility is remotely located from the base hospital or clinic.

b. Circulation and Adjacency Considerations. This space shall be readily accessible to all activity spaces and adjacent to the other staff spaces. Figure 5-15 shows a typical layout and circulation arrangement for a classroom.

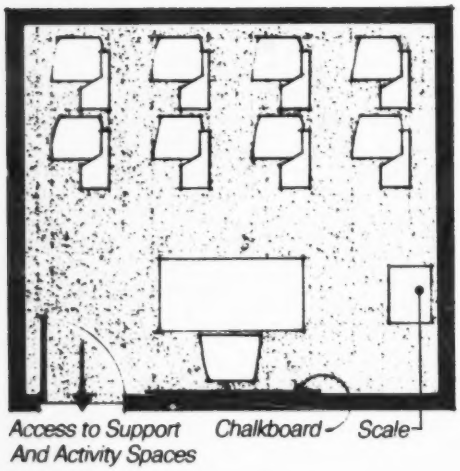
c. Size.
- Typical floor area is 150 to 250 ft.² (13.9 to 23 m².)
- The floor area shall approximate 20 ft.² (1.85 m²) for each occupant.
- The ceiling height shall be 9'-0" (2.75 m) min.

d. Furnishings and Equipment.
- Counter with sink (optional)
- Wall cabinets
- Examination table (optional)
- Weight scales (optional)
- Whirlpool bath (optional)
- Chairs and desks for classroom use.

e. Materials and Finishes.
- Floor: Resilient tile.
- Base: Resilient tile.
- Walls: Painted masonry or gypsum board.
- Ceiling: Acoustical or painted gypsum board.

f. Special Planning Considerations. Access ways between this room and the building entry shall be sized for emergency stretchers.

Figure 5-15:
Classroom Layout



3. Laundry

a. Use. The laundry room provides a space for washing, drying and temporary storage of towels and athletic apparel.

b. Circulation and Adjacency Considerations. Figure 5-16 shows typical layout and circulation arrangements for a laundry room.
- This space shall be readily accessible to the equipment issue room.
- This space shall be adjacent to the other staff spaces.

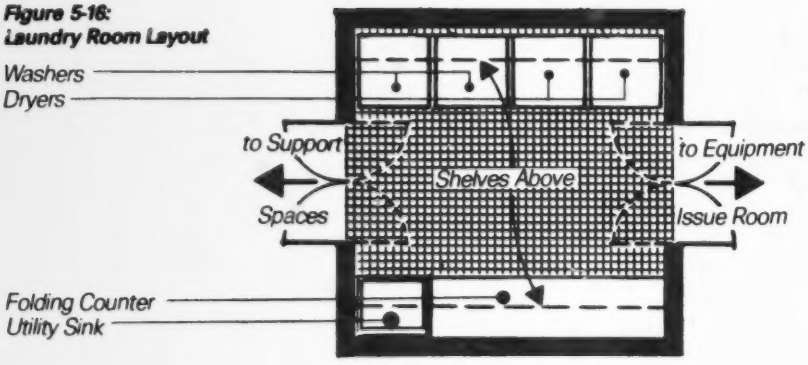
c. Size and Occupant Load. The quantity and type of articles to be laundered, and the extent that a central laundry or commercial service is used, will establish the size of this space.
- Typical laundry room floor area is 100 to 200 ft.² (9.3 to 18.6 m²).
- Ceiling height shall be at least 9'-0" (2.75 m).

d. Furnishings and Equipment.
- Shelving and equipment
- Commercial washers and dryers
- Service sink
- Folding counter
- Laundry carts

e. Materials and Finishes. All finishes shall be humidity-resistant.
- Floor: Ceramic or resilient tile. The floor material and finish shall be able to withstand repeti tive use by wheeled laundry carts.
- Base: Ceramic or resilient
- Walls: Painted masonry.
- Ceiling: Acoustical or painted gypsum board.

f. Special Environmental Considerations.
- Separate exhaust for the dryers is required.
- The floor shall slope to a sanitary drain.

Figure 5-16:
Laundry Room Layout



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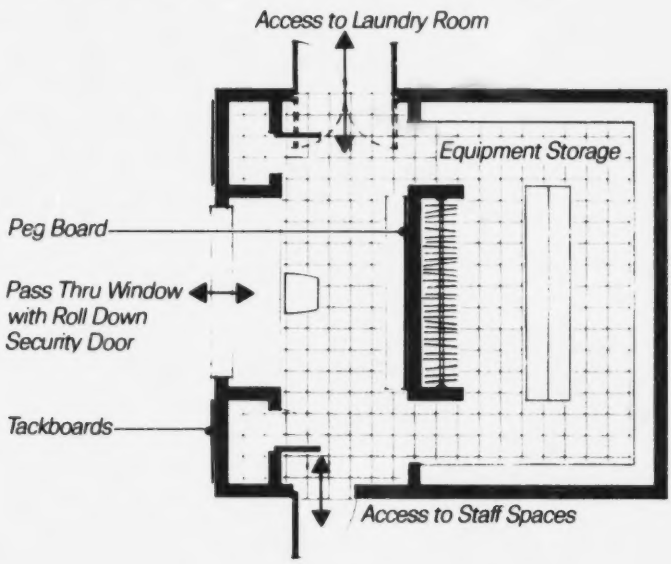
4. Equipment Issue Room

a. Use. The equipment issue room is primarily used for the storage and issuing of athletic equipment, towels and uniforms. This space may also provide control and observation of public circulation.

b. Circulation and Adjacency Considerations. Figure 5-17 shows typical layout and circulation arrangement for an equipment issue room.
- The equipment issue room shall be readily accessible to all activity and support spaces.
- The space shall be adjacent to other staff spaces.
- If this space is used for control of circulation, it shall be adjacent to public lobby.

Figure 5-17:
Equipment Issue Room Layout



c. Size. The amount of equipment to be stored will establish the size of the space.
- Typical floor area ranges from 100 to 400 ft.² (9.3 to 37.2 m²) for this space.
- Ceiling height shall be at least 9′-0″ (2.75 m).
- The equipment issue room will be operated by 1 or 2 staff personnel.

d. Furnishings.
- Public address microphone
- Storage units including shelving, counters, and pegboards
- 1 to 2 desks
- 1 to 2 chairs
- View windows
- Tackboard
- Safe (optional)
- Baskets and basket racks (optional)
- Hanging bars (optional)

e. Equipment. *AFR 215-22* prescribes the minimum athletic equipment requirements to be furnished by the base.

f. Materials and Finishes.
- Floor: Resilient tile. The floor material and finish should be able to withstand repetitive use by wheeled laundry and equipment carts.
- Base: Resilient tile.
- Walls: Painted masonry or gypsum board.
- Ceiling: Acoustical or painted gypsum board.

g. Special Considerations. The central controls for the public address and lighting systems shall be located in this area.

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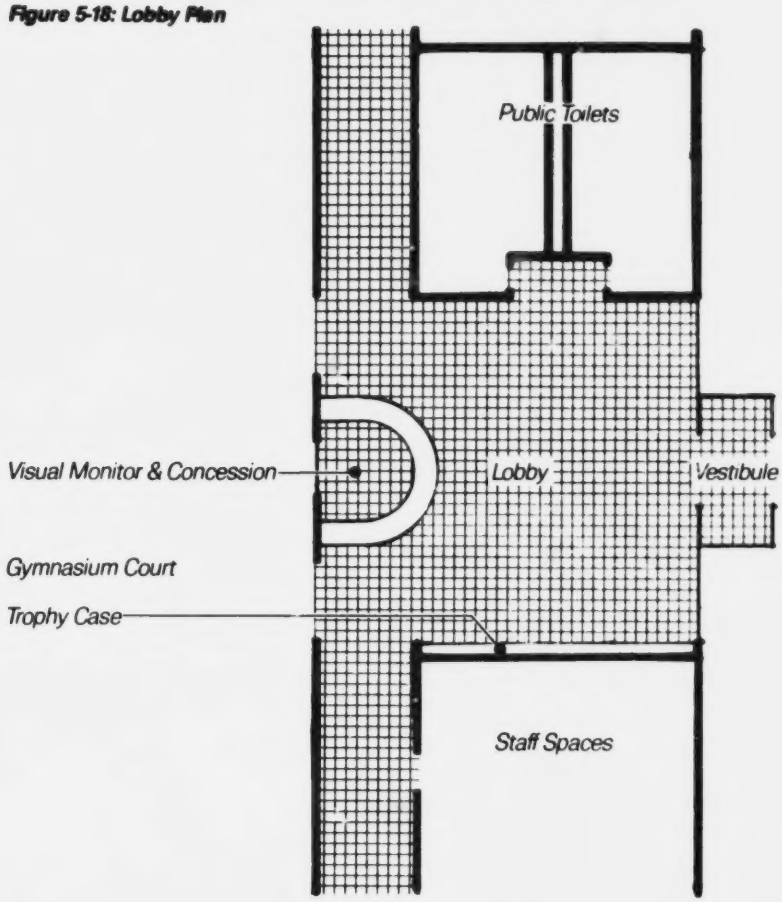
E. Public and Other Spaces

These spaces are required for general uses, and include both areas and rooms assigned to the net area of the facility (Juice Bar/Lounge and Concession/Vending) and those considered part of the total gross area only.

Figure 5-18: Lobby Plan



1. Lobby

a. Use. The lobby serves as the primary entrance to the facility for all participants, visitors, and spectators. Optional co-use functions that may be provided include concession, vending, trophy display, and lounge.

b. Circulation and Adjacency Considerations. Figure 5-18 shows typical layout and circulation arrangement for a lobby and its adjacent spaces.
- Direct access from the lobby is required to all spectator viewing areas, the support spaces and the gymnasium court.
- Public toilets, staff offices, and the Concession/Vending area, if separate, shall be adjacent to this space.
- Visual monitoring of the lobby from the staff offices or the equipment issue room is required to control access to activity and support spaces.

c. Size. The amount of co-use functions included and the peak number of spectators or visitors shall establish the size of the lobby.
- Floor area for the lobby shall approximate 3 ft.^{2} (.28 m^2) for each occupant of the lobby. At least 50 percent of the visitors in the largest spectator seating area shall be accommodated.
- Typical lobby floor area ranges from 400 to 1500 ft.^{2} (37.2 to 139.4 m^2), and 2 to 3 percent of the gross area of the facility.
- Ceiling height for the lobby shall be at least 10'-0" (3.6 m).

d. Furnishings.
- 2 to 10 chairs
- 1 to 2 waste receptacles
- 1 to 3 public phones
- 1 to 2 trophy cases (optional)
- 1 to 2 tackboards (optional)

e. Materials and Finishes.
- **Floor: Carpet, resilient tile, abrasive ceramic tile, or masonry.**
- Base: Resilient or glazed tile.
- Walls: Painted masonry, painted or vinyl gypsum board, or painted plaster.
- Ceiling: Acoustical or painted gypsum board.

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2. Public Toilets

a. Use. These toilet rooms are primarily used by visitors. Separate rooms shall be provided for men and women.

b. Circulation and Adjacency Considerations. These rooms should be located adjacent to the lobby and be readily accessible to all spectator viewing areas.

Table 5-9:
Fixture Requirements for Public Toilets

	Fixtures per Number of Men	*Fixtures per Number of Women*	*Floor Area Required for Each Fixture*	
			ft.²	m²
Water Closet	1/250	1/150	30	2.79
Lavatory	1/200	1/150	10	0.93
Urinal	1/250	—	15	1.40
Drinking Fountain	1/400	1/400	15	1.40
Handicapped W.C.	1 min.	1 min.	40	3.72

c. Size. The peak number of spectators or visitors anticipated establish the size of the public toilets. An equal number of men and women shall be assumed unless local circumstances indicate otherwise.
- Fixture allocation and size shall be as listed in Table 5-9.
- Typical floor area for both toilet rooms ranges from 200 to 1500 ft.² (18.6 to 139.4 m²).
- Ceiling height shall be at least 8′-0″ (2.45 m²).

d. Furnishings and Equipment. *AFM 88-8* prescribes the specific toilet room fixture and accessory requirements.

e. Materials and Finishes. All room finishes shall be water and humidity resistant.
- Floor: Ceramic tile.
- Base: Glazed or ceramic tile.
- Wainscot: Glazed or ceramic tile.
- Walls: Painted masonry, moisture-resistant gypsum board, portland cement plaster, or high strength gypsum plaster.
- Ceiling: Painted moisture-resistant gypsum board, Keene's cement plaster, portland cement plaster, or high strength gypsum plaster.

f. Special Environmental Considerations. A separate exhaust system shall be provided for the toilet rooms.

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3. Concession/Vending

a. Use. This space contains vending machines, public telephones, and space for temporary food and drink service at special events.

b. Circulation and Adjacency Considerations.
- This space shall be adjacent to the lobby and public toilets and shall be readily accessible to all spectator viewing areas.
- Access may be provided from this space to an outdoor lounge area, if any.

c. Size.
- Typical floor area ranges from 75 to 150 ft.² (7.0 to 14.0 m²).
- Ceiling height shall be at least 9'-0" (2.75 m).

d. Equipment and Furnishings.
- 3 to 5 vending machines for coffee, soft drinks, candy and ice cream
- 1 to 2 waste receptacles
- 1 to 3 public telephones
- 1 drinking fountain
- A counter for concessions during special events (optional)

e. Materials and Finishes.
- **Floor: Carpet, resilient tile, abrasive ceramic tile, or masonry.**
- Base: Resilient or glazed tile.
- Walls: Painted masonry, painted or vinyl covered gypsum board, or painted plaster.
- Ceiling: Acoustical or painted gypsum board.

f. Special Planning Considerations. The ability to visually monitor access to the space from the offices is required to limit the consumption of food to the non-athletic areas.

g. Special Environmental Considerations. Electrical and plumbing service is required for the vending machines and drinking fountain.

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4. Juice Bar/Lounge

a. Use. The lounge provides an area for informal relaxation where users can have healthful refreshments.

b. Circulation and Adjacency Considerations. Figure 5-19 shows typical layout and circulation arrangement for a juice bar/lounge.
- The lounge shall be readily accessible to the lobby, all support spaces and the public toilets.
- A secure storage room shall be provided adjacent to the lounge area.
- A view of activity spaces from this space is encouraged.
- Direct access to an outdoor lounge area, if any, is encouraged.

c. Size.
- Floor area for the lounge shall approximate 20 ft.² (1.85 m²) per occupant.
- At least 15 percent of the total area shall be used for storage of supplies.
- Typical floor area ranges from 200 to 300 ft.² (18.5 to 27.9 m²) serving 8 to 13 occupants and including storage.
- Ceiling height shall be at least 8'-0" (2.45 m).

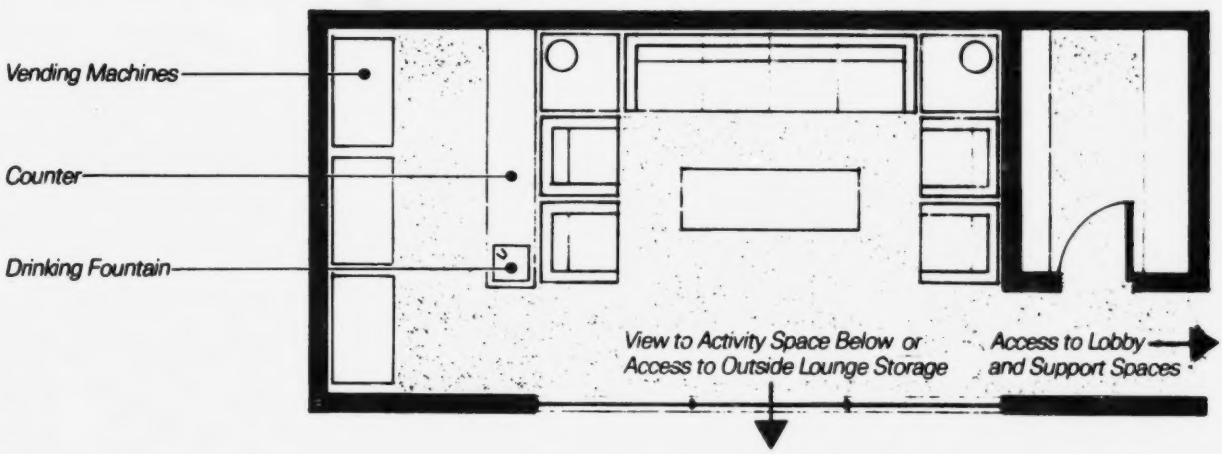
d. Furnishings and Equipment.
- 8 to 13 lounge chairs
- 5 to 10 coffee tables
- 1 drinking fountain
- 2 to 4 vending machines
- 1 to 3 waste receptacles
- Shelving in the storage room
- A counter for refreshment service (optional)
- Service sink (optional)

e. Materials and Finishes.
- Floor: Carpet or resilient tile.
- Base: Resilient tile.
- Walls: Painted masonry, painted or vinyl covered gypsum board, or painted plaster.
- Ceiling: Acoustical or painted gypsum board.

f. Special Planning Considerations.
- The ability to visually monitor the interior access to the area from the offices is required to limit the consumption of food to non-athletic areas.
- Proximity to the lobby is desirable to provide lounge space for additional occupants during special events.
- For small facilities with limited staff, the juice bar and its storage room may be located as an extension of the equipment issue room if these spaces are adjacent to the lobby for lounge use.
- This space may be located to overlook tennis or handball/racquetball courts.

g. Special Environmental Considerations. Electrical and plumbing services are required for the vending machines and drinking fountain.

Figure 5-19:
Juice Bar/Lounge Layout



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5. Corridors and Stairs

a. Use. The corridors and stairs provide the means for circulation of staff, participants, visitors and spectators.

b. Circulation and Adjacency Considerations. The corridors and stairs shall link the lobby to all activity, support, staff, and public spaces.

c. Size.
- The width of corridors shall be at least 8'-0" (2.44 m)
- The width of stairs shall be at least 4'-0" (1.22 m).
- The ceiling height of the corridors shall be at least 9'-0" (2.74 m), and at least 7'-0" (2.13 m) clearance shall be provided at stairs.

d. Materials and Finishes.
- Stair treads and risers: Resilient **tile**.
- Floor: Resilient **tile**.
- Base: Resilient **tile**.
- Walls: Painted masonry, painted or vinyl covered gypsum board, or painted plaster.
- Ceiling: Acoustical or painted gypsum board.

6. Mechanical Room and Maintenance Spaces

a. Use. The mechanical room serves as the primary location for the mechanical and electrical equipment. The mechanical spaces may also include smaller utility closets located throughout the building. The maintenance spaces will consist of one or more janitor's closets for custodial purposes.

b. Circulation and Adjacency Considerations.
- Direct access shall be provided from the main mechanical room to an exterior service entrance.
- All circulation associated with the mechanical services and maintenance operations shall be separate from circulation provided for the participants and visitors.

c. Furnishings and Equipment. Each janitor's closet shall include a service sink and shelving for cleaning supplies.

d. Materials and Finishes.
- Floor: Concrete or, in janitor's closets only, resilient **tile**.
- Walls: Painted masonry.
- Ceilings: Painted gypsum board.

e. Special Planning Considerations. The mechanical room shall be located to minimize lengths of distribution services. Janitor's closets shall be located in close proximity to toilet rooms. The majority of the time, mechanical rooms shall be at grade level.

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A. Development of Design

In addition to complying with the criteria, the design shall provide a compatible solution for the specific project requirements. An individual design is required for the specific site that enhances the surrounding built and natural character of the base. Other factors that determine the success of the design include:

1. Value

The design shall result in a complete facility that can be constructed within the project funds and maintained economically.

2. Operating Efficiency

The spaces shall be arranged for an effective operation consistent with the specific needs of the base, and to allow for anticipated future expansions.

3. Consideration of Climate

The design shall maximize the advantages and minimize the disadvantages of the environmental conditions of the base.

B. Project Cost

The design shall be guided by considerations that reduce project cost. The following basic decisions shall be part of the design where they result in savings in the total construction and operating costs, and where they are permitted by other project requirements.

1. Floor Area

The gross area of the facility can be less than the authorized size. A compact plan can minimize floor areas for corridors, walls and structure. Also, area can be reduced by using multipurpose spaces that will efficiently allow two or more activities at the same time or by sharing time, instead of single spaces that are each limited to one activity.

2. Building Massing

Structural, building enclosure and mechanical costs can be reduced with a compact building volume. Generally, the support spaces as a group, handball/racquetball courts, squash courts, weight rooms or exercise rooms, can function satisfactorily on a different level than the public spaces, staff spaces, and gymnasium court.

3. Simplified Construction

The following means to simplify construction are encouraged where they are feasible:

a. Use of pre-engineered building systems where they are locally available and where they can be supplied and maintained economically.

b. Use of familiar building assemblies and forms that do not require a specially qualified labor force or special construction equipment for installation.

c. Location of those spaces that require similar mechanical services in one area to limit piping and duct runs.

d. Use of materials that are locally available.

e. Minimize the variety of materials used.

4. Energy Management

Operating costs can be reduced by applying the principles of passive solar design, such as optimizing the effective use of insulation and using fuels that are locally available and can be provided economically and reliably for the life of the facility

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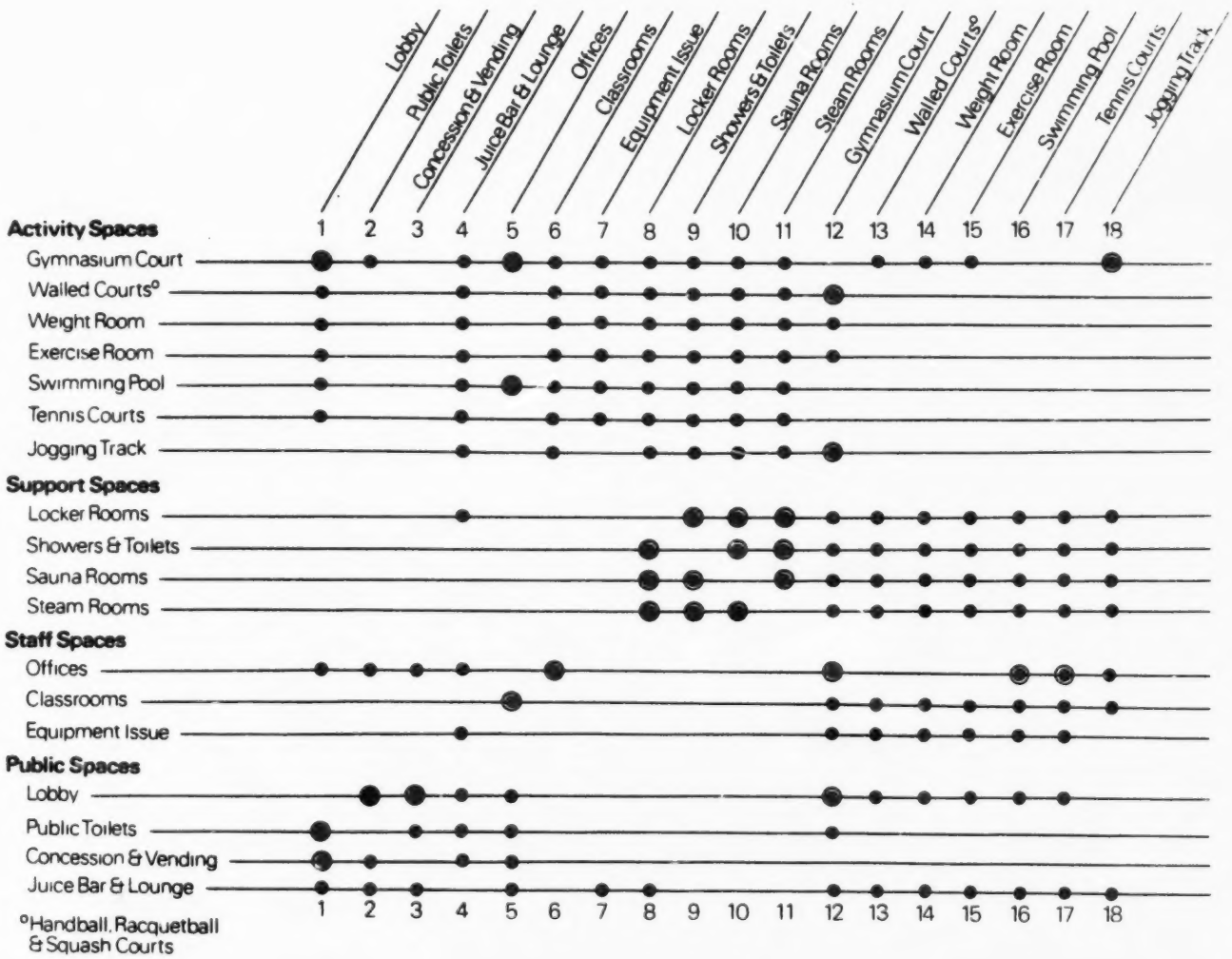
C. Relationship of Spaces

Tables 6-1 through 6-3 list the generally preferred functional relationships of the project spaces. The specific project requirements may require different or additional relationships.

1. Operational Adjacency

To maximize the efficient operation of the facility, the spaces shall be arranged to result in the proximities listed in Table 6-1.

Table 6-1:
Operational Adjacencies



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2. Access Controls

To provide efficient but secure user circulation in the facility, the spaces shall be arranged to result in the following accessibility and supervision requirements listed in Table 6-2.

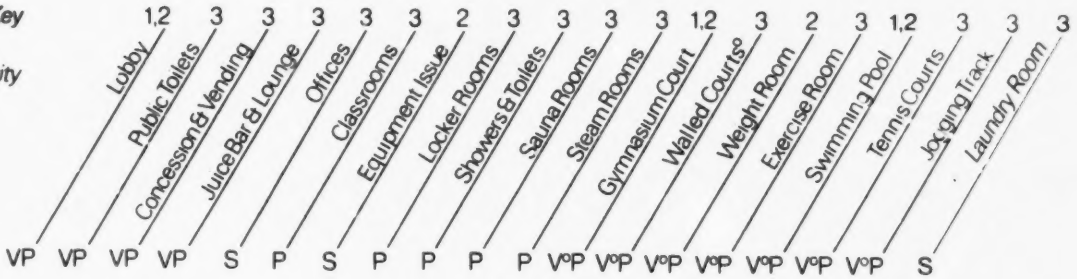
3. Expansion Potential

In anticipation of future changes in athletic programs requiring enlarged or additional activity areas, the spaces shall be arranged to allow the following potentials for expansion listed in Table 6-3.

Table 6-2: Access Controls

Visual Monitoring Key

1 = Of Activity Itself
2 = Of Entrance to Activity
3 = Not Required



S = Staff Only
P = Participant
V = Visitor
Vº= Spectator Viewing Only

Table 6-3:
Expansion Potential

Activity Spaces

Walled Courts§	1
Weight Room	1
Exercise Room	2
Tennis Courts	2

Support Spaces

Locker Rooms	2
Showers & Toilets	2

Staff Spaces

Offices	2

§Handball, Racquetball & Squash Courts

1 = Highly Likely
2 = Possible

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D. Environmental Influences

The design shall be suited for the specific climate of the base. Table 6-4 describes the design elements and arrangements generally preferred for various environmental conditions. Those elements and arrangements, or equivalent design provisions appropriate for the specific climate and site, shall be provided where they result in project cost savings.

1. Hot-Dry Climates

Locations where the dry bulb temperature is at least 93°F for 155 or more hours during the 6 warmest months of the year, and where the annual amount of rainfall is 10 inches (3.94 cm) or less are defined as hot-dry climates.

2. Warm-Humid Climates

Locations where the wet bulb temperature is at least 67°F for 800 hours or more during the 6 warmest months of the year are defined as warm humid climates.

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Table 6-4:
Environmental Considerations

3. Temperate Climates

Locations where the dry bulb temperature is at least 80°F for 350 hours or more during the 6 warmest months of the year are defined as temperate climates.

4. Cold Climates

Locations where the dry bulb temperature is at least 80°F for less than 350 hours during the 6 warmest months of the year are defined as cold climates.

	Maximize direct solar gain and minimize heat losses	Balance solar heat gain on a seasonal basis	Reduce direct solar and conductive heat gains	Minimize solar sky and ground reflectance	Moderate temp extremes (daily and/or seasonal fluctuations)	Reduce cold air infiltration (protect against prevailing winds)	Use air movement to promote evaporative cooling	Promote natural convective loops
Optimize ratio of exterior wall surfaces to interior floor space	C		H		HC			
Orient the building along the east-west axis	C	T	HW		H		W	W
Openings facing the afternoon sun — Maximize	C							
Openings facing the afternoon sun — Minimize			HW		H			
Provide shading at openings		T	HW	C	H			
Place low use spaces adjacent the • West-facing exterior wall			H	W	H			
Place low use spaces adjacent the • Prevailing winter wind facing wall	C	T				CT		
Consider berming earth against building perimeter wall	C		HW		H	CT		
Locate windows for cross ventilation during warmest months							THW	
Provide ground cover & minimize paved surfaces adjacent to building				THW				W
Use low conductive materials for the building envelope	C		W					
Use light reflective finishes & colors on roof & exterior walls			HW					
Use dark finishes & colors for the roof & exterior walls	C							
Consider shaded, landscaped courtyards & garden entrances			HW				H	
Use concrete or masonry materials for • Interior surfaces exposed to sunlight	C							
Use concrete or masonry materials for • Exterior wall construction			H		H			
Provide on site • Heavy vegetation			W		H		H	
Provide on site • Water features (reflecting pools)					H		H	

H = Hot-Dry
W = Warm-Humid
C = Cold
T = Temperate

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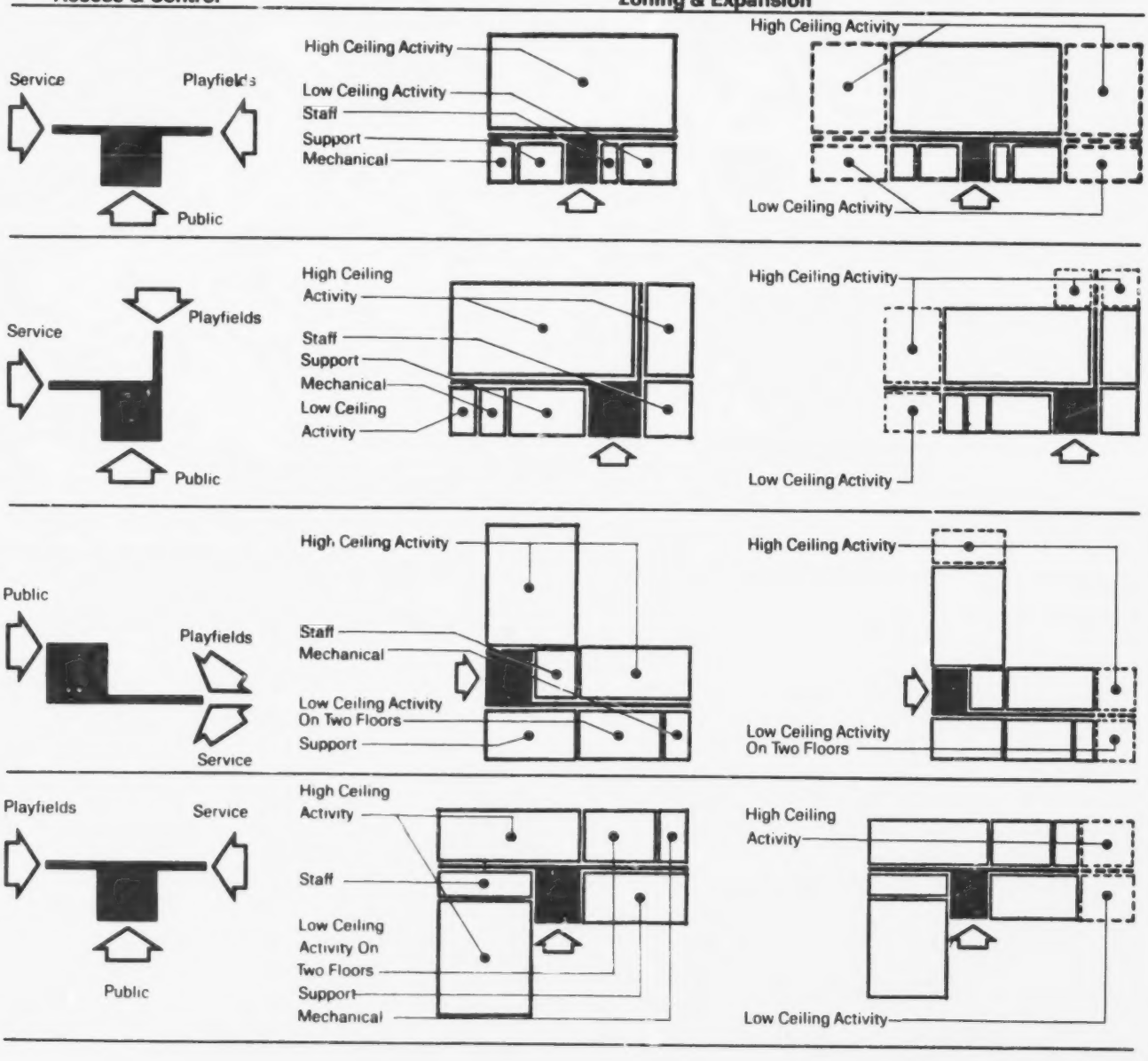
Figure 6-1:
Organizing Principles

E. Organization Principles

The design shall be formed by creatively organizing the components of the project in an architectural concept for the specific site. Figure 6-1 shows sample concepts based on organization principles that fulfill the design objectives. The specific project requirements will vary from these examples, requiring additional analysis for the particular design.



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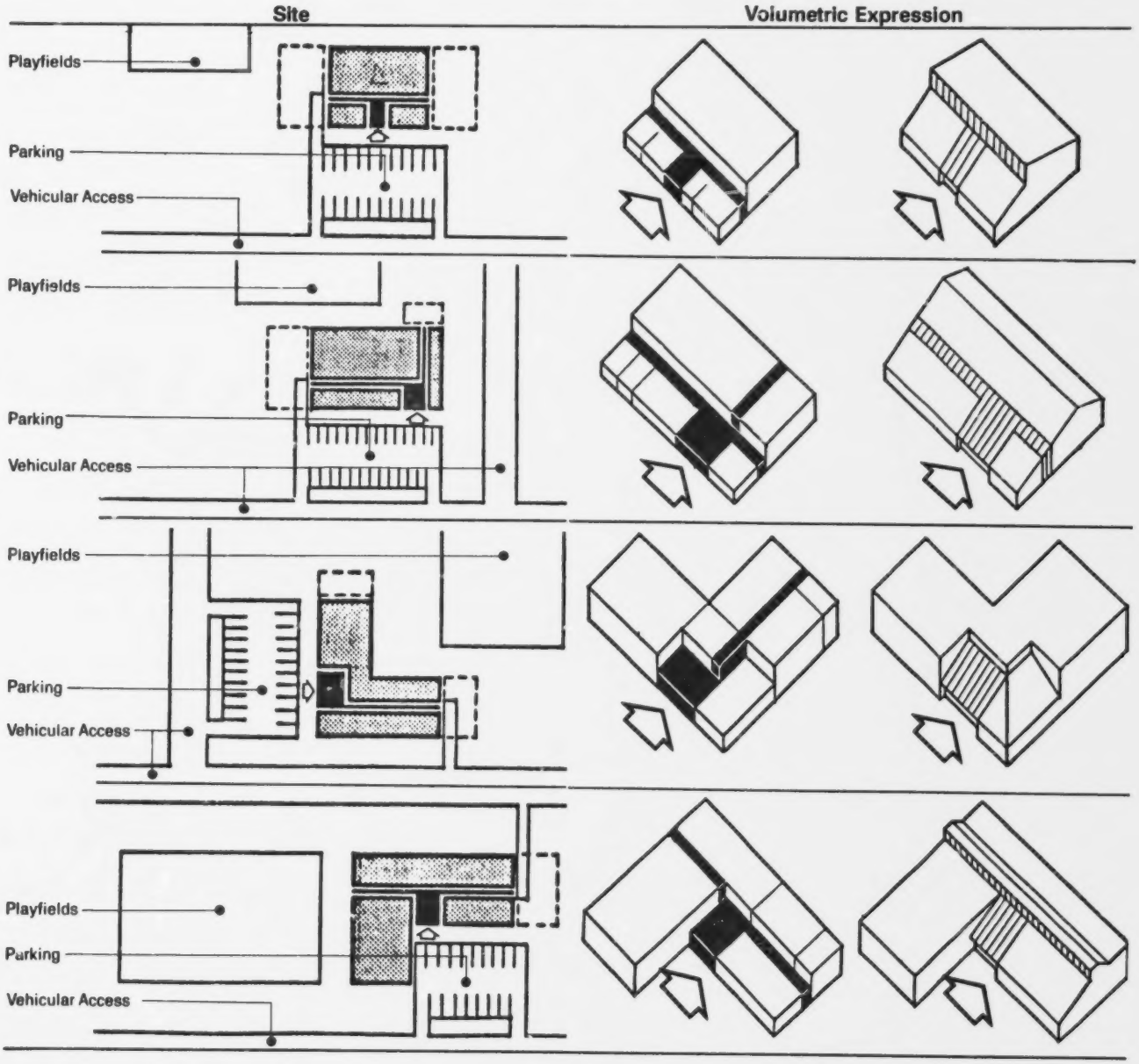
For a gymnasium, field house or indoor sports complex, the design must be organized for efficient access control, spatial zoning and expansion potential that fits the site constraints and results in an attractive building volume.



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F. Illustrative Design Schemes

Each project design shall be a unique concept appropriate for the local character of the base. The following design schemes illustrate typical concepts based on assumed conditions and requirements. They are not intended as predetermined solutions but are offered for guidance only.

Table 6-5: Space Program and Occupancy Estimates

	Occupant Load	*Floor Area* ft.²	m²
Activity Spaces			
Gymnasium Court	50 Users & 300 Spectators	7,830	727.4
Handball/Racquetball Courts (8)	32 Users & 30 Spectators	6,400	594.6
Weight Room	33 Users	1,500	139.4
General Exercise Room	33 Users	1,500	139.4
Total	*148 Users & 330 Spectators*	*17,230*	*1600*
Support Spaces			
Men's Locker Room	266 Locker Units	610	56.7
Men's Shower & Toilet Rooms	133 Users (Base figure)	470	7.0
Men's Sauna	8 Users	75	7.0
Men's Steam Room	8 Users	75	7.0
Women's Locker Room	30 Locker Units	70	6.5
Women's Shower & Toilet Rooms	15 Users (Base figure)	115	10.7
Women's Sauna	4 Users	40	3.7
Women's Steam Room	4 Users	40	3.7
Total		*1,495*	*138.9*
Staff Spaces			
Offices	3 Full-Time Staff	300	27.9
Laundry		125	11.6
Equipment Issue Room		200	18.6
Total	*3 Full-Time Staff*	*625*	*58.1*
Net Area		*19,350*	*1798*
Public Lobby, Corridors, Stairs		3,190	296.4
Men's Public Toilet	165 Visitors (Base figure)	110	10.2
Women's Public Toilets	165 Visitors (Base figure)	100	9.3
Mechanical & Maintenance		1,000	92.9
Walls and Structure		2,000	185.8
Gross Area		*25,750*	**2392**

1. Example of a Gymnasium

The project is to provide a medium sized gymnasium, 25,750 ft.² in area, for a base with a military strength of 1,500. The base is located in the central United States. The gymnasium will replace a temporary inadequate facility housed in a hangar scheduled for conversion to another use.

a. The climate of the region is temperate. The prevailing summer winds are from the southeast. Winter weather includes little snow, with prevailing winds from the northwest.

b. The site selected for the gymnasium is on the northwest corner of two major streets. One street primarily serves housing, and the other leads to the work center of the base. The site is relatively flat with ample open space to add outdoor playing fields.

c. Since facilities at a nearby college are available for varsity games, the gymnasium will not be used for varsity competition. However, some spectator seating is to be included in the gymnasium for intramural basketball.

d. Weight and general exercise rooms are expected to be heavily used. Separate areas for men and women are therefore required.

e. Future expansion is expected to be limited to additional handball courts. The gymnasium shall include the program of spaces listed in Table 6-5. An illustrative design for this project is shown in Figure 6-2.

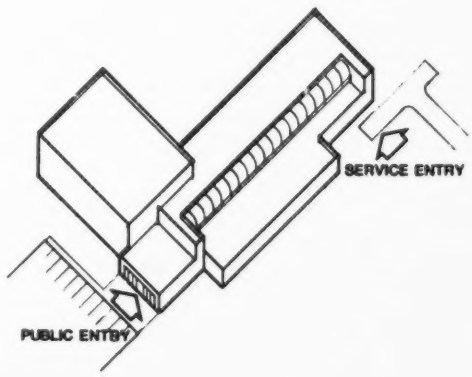

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Figure 6-2:
Illustrative Design
Gymnasium

1. *Gymnasium Court*
2. *General Exercise Room*
3. *Weight Room*
4. *Handball/Racquetball Court*
5. *Squash Court*
6. *Equipment Storage*
7. *Spectator Seating*
8. *Viewing Gallery*
9. *Locker Room*
10. *Toilets*
11. *Showers*
12. *Sauna*
13. *Steam Room*
14. *Staff Office*
15. *Laundry Room*
16. *Equipment Issue Room*
17. *Public Lobby*
18. *Public Toilets*
19. *Mechanical Room*

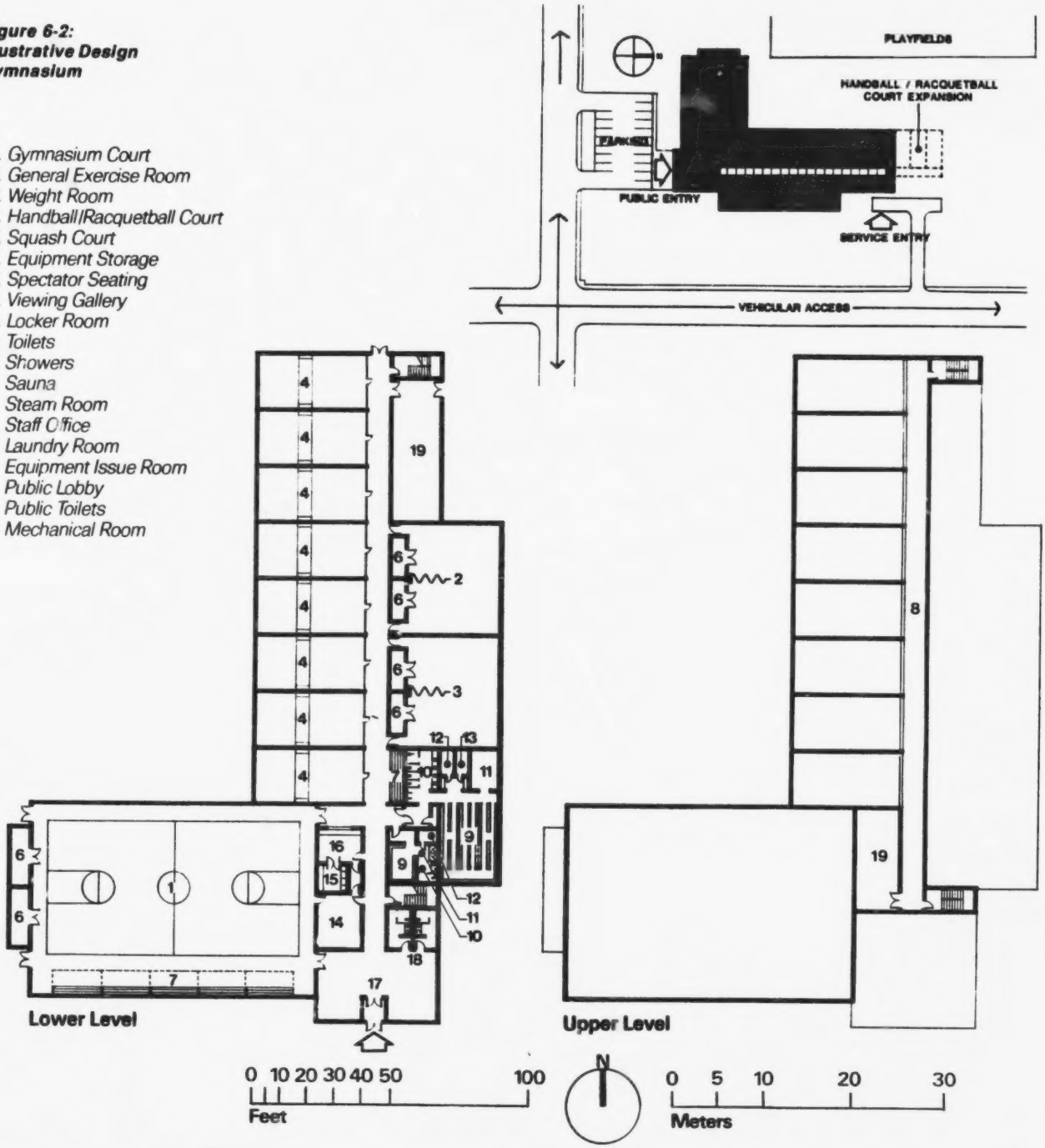

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Table 6-6:
Space Program and Occupancy Estimates

	Occupant Load	Floor Area ft.²	Floor Area m²
Activity Spaces			
Gymnasium Court	50 Users & 600 Spectators	10,460	971.1
Handball/Racquetball Courts (8)	32 Users & 30 Spectators	6,400	594.6
Squash Courts (2)	4 Users	1,200	111.5
Weight Room	36 Users	1,600	148.6
General Exercise Room	36 Users	1,600	148.6
25m, 6-lane Swimming Pool	246 Users & 300 Spectators	8,750	812.9
3-lane Jogging Track	50 Users	2,430	225.7
Total	***454 Users & 930 Spectators***	***32,440***	***3,013***
Support Spaces			
Men's Locker Room	817 Locker Units	1,810	168.2
Men's Shower & Toilet Rooms	409 Users (Base figure)	1,265	117.5
Men's Sauna	20 Users	180	16.7
Men's Steam Room	20 Users	180	16.7
Women's Locker Room	91 Locker Units	200	18.6
Women's Shower & Toilet Rooms	46 Users (Base figure)	155	14.4
Women's Sauna	6 Users	60	5.6
Women's Steam Room	6 Users	60	5.6
Total		***3 910***	***363.3***
Staff Spaces			
Offices	4 Full- & 1 Part-Time Staff	450	41.8
Laundry		150	13.9
Equipment Issue Room		350	32.5
Total	***4 Full- & 1 Part-Time Staff***	***950***	***88.3***
Public Spaces			
Juice Bar/Lounge	10 Users	200	18.6
Total		***200***	***18.6***
Net Area		***37,500***	***3484***
Public Lobby, Corridors, Stairs		6,300	585.3
Men's Public Toilet	465 Visitors (Base figure)	160	14.9
Women's Public Toilets	465 Visitors	190	17.7
Mechanical & Maintenance		1,350	125.4
Walls and Structure		4,500	418.1
Gross Area		***51,650***	***4645***

2. Example of a Field House

The project is to provide a small field house, 50,000 ft.² in area, for a base with a military strength of 7,000. The base is located in the southeast United States. The field house is required to augment the existing athletic facility, consisting of adequate outdoor playing fields, but only one small gymnasium.

a. The climate of the region is warm and humid, with the prevailing winds from the southwest in the summer and from the northwest in the winter.

b. The site selected for the field house is south and west of the existing playing fields, including outdoor tennis courts. The street along the south boundary of the site connects the residential and work areas of the base.

c. The field house will be used for occasional varsity events in basketball and swimming. The pool will be used throughout the year for military training as well as for recreation and competition. Office personnel and operations for the swimming pool will be separate from the staffing for the remainder of the facility.

d. Weight and general exercise rooms are expected to be heavily used. Separate areas for men and women are therefore required.

e. Future expansion is expected to be limited to additional handball/racquetball courts and squash courts. The field house shall include the program of spaces listed in Table 6-6. An illustrative design for this project is shown in Figure 6-3.

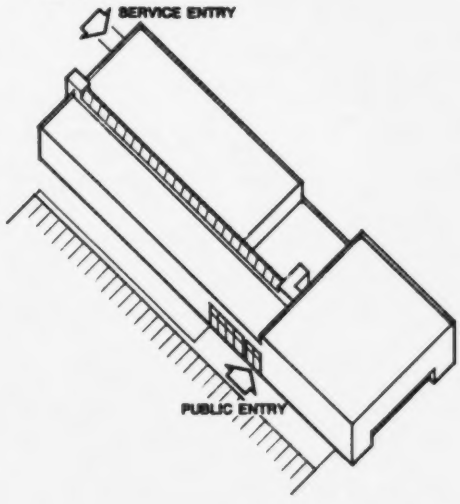

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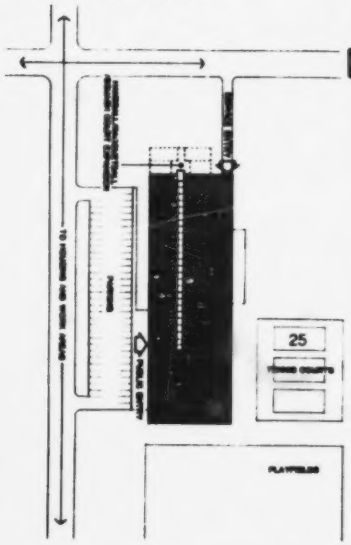
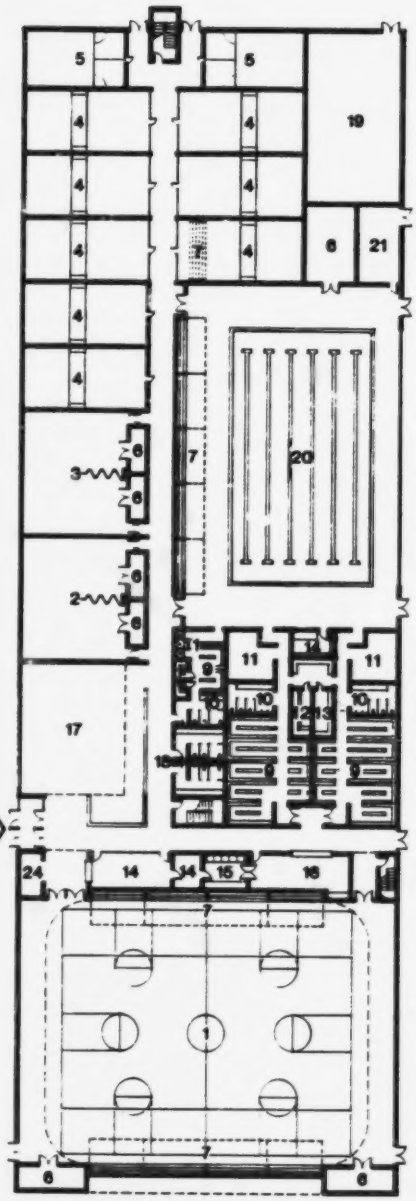
Figure 6-3:
Illustrative Design
Field House

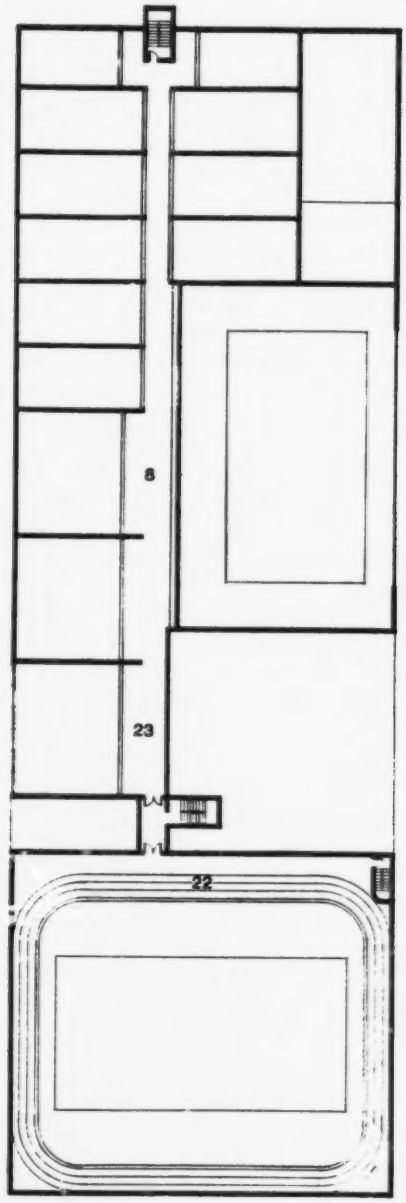
1. *Gymnasium Court*
2. *General Exercise Room*
3. *Weight Room*
4. *Handball/Racquetball Court*
5. *Squash Court*
6. *Equipment Storage*
7. *Spectator Seating*
8. *Viewing Gallery*
9. *Locker Room*
10. *Toilets*
11. *Showers*
12. *Sauna*
13. *Steam Room*
14. *Staff Office*
15. *Laundry Room*
16. *Equipment Issue Room*
17. *Public Lobby*
18. *Public Toilets*
19. *Mechanical Room*
20. *Swimming Hall*
21. *Pump Room*
22. *Jogging Track*
23. *Juice Bar/Lounge*
24. *Vending*
25. *Tennis Courts*





Lower Level

0 10 20 30 40 50
Feet



Upper Level

0 5 10 20
Meters

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Table 6-7:
Space Program and Occupancy Estimates

	Occupant Load	Floor Area ft.²	Floor Area m²
Activity Spaces			
Gymnasium Court	50 Users & 120 Spectators	11,000	1021.0
Handball/Racquetball Courts (3)	12 Users & 30 Spectators	2,400	223.0
Squash Court	2 Users	600	55.7
Weight Room	22 Users	1,000	92.9
General Exercise Room	22 Users	1,000	92.9
50m, 6-lane Swimming Pool	493 Users & 300 Spectators	14,430	1341.7
3-lane Jogging Track	50 Users	2,430	225.7
Tennis Courts (2)	8 Users & 150 Spectators	14,000	1,301
Total	***659 Users & 1680 Spectators***	***46,860***	***4353***
Support Spaces			
Men's Locker Room	1,186 Locker Units	2,610	242.5
Men's Shower & Toilet Rooms	593 Users (Base figure)	1,815	168.6
Men's Sauna	30 Users	270	25.1
Men's Steam Room	30 Users	270	25.1
Women's Locker Room	132 Locker Units	290	20.9
Women's Shower & Toilet Rooms	66 Users (Base figure)	225	20.9
Women's Sauna	8 Users	75	7.0
Women's Steam Room	8 Users	75	7.0
Total		***5,630***	***523.0***
Staff Spaces			
Offices	4 Full-Time Staff	400	37.2
Laundry		150	13.9
Equipment Issue Room		400	37.2
Total		***950***	***89.3***
Public Spaces			
Concession/Vending		150	13.9
Juice Bar/Lounge	12 Users	250	23.2
Total		***400***	***37.2***
Net Area		***53,840***	***5002***
Public Lobby, Corridors, Stairs		8,070	749.7
Men's Public Toilet	840 Visitors (Base figure)	285	26.5
Women's Public Toilets	840 Visitors (Base figure)	335	31.1
Mechanical & Maintenance		3,000	278.7
Walls and Structure		6,270	582.5
Gross Area		***71,800***	***6670***

3. Example of an Indoor Sports Complex

The project is to provide a large indoor sports complex, 6,670 m² in area, for a base with a military strength of 10,000. The base is located in northeast Europe. The indoor sports complex must provide authorized facilities in one central location on the base to maximize use in this adverse natural environment.

a. The climate of the region is cold, with heavy snowfalls and prevailing winds from the northwest in the winter.

b. The site selected for the indoor sports complex is relatively flat with ample space for outdoor playing fields. Major streets leading to housing and work areas border the site on the north and south.

c. The indoor sports complex will be extensively used for varsity events in basketball, swimming, and tennis. Because of limited staff personnel available, one location is required for all office operations.

d. Weight and general exercise rooms are expected to be moderately used, with men and women sharing the same space or scheduled at different times.

e. Future expansion is expected to be limited to additional tennis courts, handball/racquetball courts and squash courts. The indoor sports complex shall include the program of spaces listed in Table 6-7. An illustrative design for this project is shown in Figure 6-4.

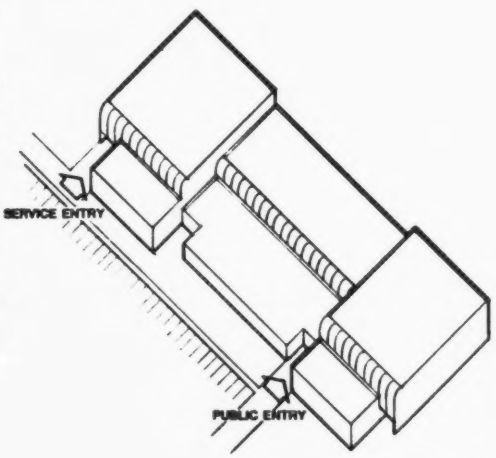

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Figure 6-4:
Illustrative Design
Indoor Sports Complex

1. *Gymnasium Court*
2. *General Exercise Room*
3. *Weight Room*
4. *Handball/Racquetball Court*
5. *Squash Court*
6. *Equipment Storage*
7. *Spectator Seating*
8. *Viewing Gallery*
9. *Locker Room*
10. *Toilets*
11. *Showers*
12. *Sauna*
13. *Steam Room*
14. *Staff Office*
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19. *Mechanical Room*
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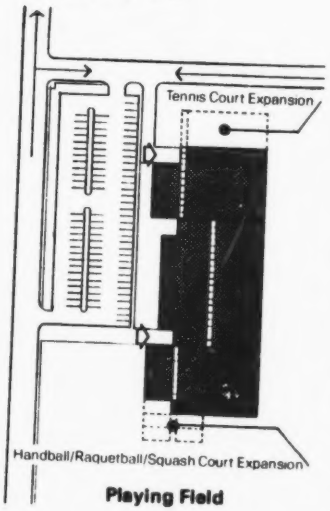
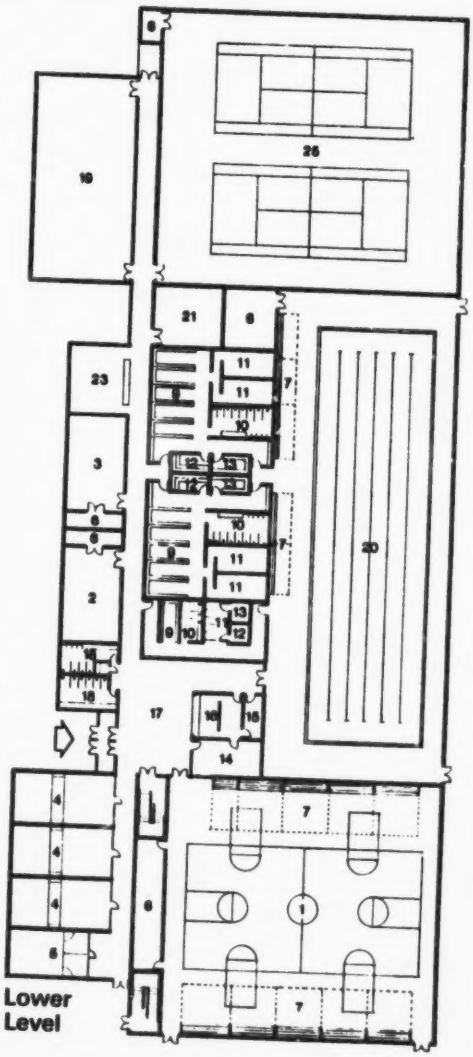
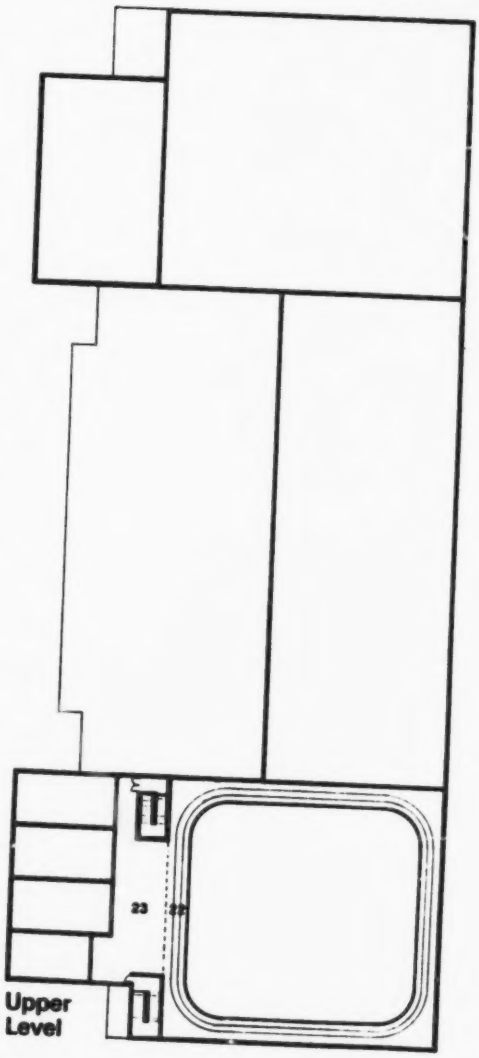
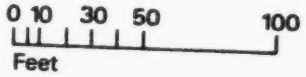
24. *Vending*
25. *Tennis Courts*









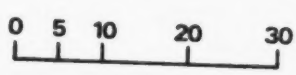


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Table 7-1:
Site Standards

	Technical Documents
1. General	
a. Clearances, Restrictions & Setbacks	AFM 86-8 & AFM 88-15, Ch. 13
b. Fire Separations Required	AFM 88-15, Ch. 13
2. Climate and Topography	
a. Meteorological Data	AFM 88-29
b. Grading, Drainage & Erosion Controls	AFM 88-15, Ch. 15 & 18
3. Utilities	
a. Water, Gas, Electrical & Heating Supply	AFM 88-15, Ch. 1, 7, 8, 10 & 12
b. Telephone & Other Communication Systems	AFM 88-15, Ch. 7
c. Sanitary & Storm Sewers	AFM 88-11, Vol. I & AFM 88-15, Ch. II
4. Landscaping	
a. Sprinkler or Irrigation Systems	AFM 88-15, Ch. 18
b. Ground Cover & Planting	AFM 86-6, AFM 86-9, AFM 88-15, Ch. 18 & AFM 88-17, Ch. 1, 2, 3 & 4
5. Site Accessories	
a. Exterior Lighting (Street, Flood & Security)	AFM 88-15, Ch. 8
b. Signage	AFM 88-40
c. Fencing & Walls	AFM 88-15, Ch. 3
d. Pedestrian & Vehicular Circulation	AFM 88-6, Ch. 2 & 3 & AFM 88-15, Ch. 15

Table 7-2:
Architectural and
Structural Standards

1. General	
a. Handicapped Accessibility Design Features	AFM 88-4, Ch. 8 & ANSI A117.1
b. Seismic Zone, Wind & Snow Load Design Criteria	AFM 88-3, Ch. 1 & 3
2. Structural	
a. Design Loads	AFM 88-3, Ch. 1 & 3
b. Foundation Systems & Their Design	AFM 88-3, Ch. 1 & 3
c. Structural Elements	AFM 88-15, Ch. 3
d. Special Conditions	AFM 88-15, Ch. 3
3. Architectural	
a. U Values & Vapor Barriers	AFM 88-15, Ch. 3
b. Sound Attenuation Requirements	AFM 88-15, Ch. 3
c. Special Finishes & Material Standards	AFM 88-15, Ch. 3
d. Special Building Elements & Criteria †	AFM 88-15, Ch. 3
e. Construction Systems & Materials	AFM 88-15, Ch. 3 & AFP 88-41
f. Signage	AFP 88-40

†For roofing, loading docks, etc.

ANSI-American National Standards Institute

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Table 7-3:
Fire Protection Standards

	Technical Documents
1. General	
a. Classification of Occupancy & Hazards of Contents	NFPA 101, Ch. 4
b. Type of Building Construction	AFM 88-15, Ch. 2 & 13
c. Fire Area Limitations	UBC, Ch. 5
d. Fire Protection Features†	AFM 88-15, Ch. 13 & NFPA 101, Ch. 6
2. Exit Requirements	
a. Types & Identification of Exits	NFPA 101, Ch. 5
b. Capacity, Number & Arrangements of Exits	NFPA 101, Ch. 5
c. Emergency Lighting & Power Sources	AFM 88-15, Ch. 13
3. Fire Protection Systems	NFPA 101, Ch. 5 & AFM 88-15, Ch. 13
4. Interior Finishes	
a. Flame Spread & Smoke Development Ratings	AFM 88-15, Ch. 13
b. Carpet & Rug Flammable Standards	AFM 88-15, Ch. 13
5. Utilities & Building Services	
a. Electrical Wiring	NFPA 70
b. Air Conditioning, Heating & Ventilation	NFPA 90 A & B
c. Gas & Related Gas Piping	NFPA 54
d. Storage of Oxidizing Materials & Chlorine for Pools	NFPA 43 A & 43 C

†*Fire Walls, Fire Partitions & Smoke Barriers*

Table 7-4:
Mechanical Standards

1. Plumbing	
a. Water Supply	AFM 88-15, Ch. 10
b. Piping and Fixtures	AFM 88-8, Ch. 4 & AFM 88-15, Ch. 4
2. Heating	
a. General Policies	AFM 88-15, Ch. 5
b. Equipment Standards	AFM 88-15, Ch. 5
c. Temperature & Controls	ASHRAE Guide, ASME Code, NFPA 31, 54, 58, 86 A & 409
3. Ventilation, Air-Conditioning & Evap.Cooling	AFM 88-15, Ch. 6, ASHRAE Guide, ASME Code

Table 7-5:
Electrical Standards

1. Power†	AFM 88-15, Ch. 7 & NEC
2. Electrical Features & Equipment	
a. Interior & Exterior Lighting††	AFM 88-15, Ch. 7 & IES Handbook
b. Outlets, Receptacles, Switches & Grounds	AFM 88-15, Ch. 7 & NEC
c. Emergency Lighting	NFPA 101, Ch. 5
d. Telephones & Other Communication Systems	AFM 88-15, Ch. 7

†*Service, Distribution Systems & Standby Requirements*
††*Types & Intensities*

Table 7-6:
Environmental Standards

1. Quality Standards & Criteria†	AFM 88-15, Ch. 11 & AFR 19-1
2. Disposal Methods††	AFM 88-11, Ch. 5 & AFM 88-15, Ch. 11

†*Air, Noise & Waste*
††*Waste Water & Solid Waste*

ASHRAE-American Society of Heating, Refrigerating, & Air Conditioning Engineers
ASME-American Soc. of Mechanical Engineers
NEC-National Electrical Code of the NFPA
NFPA-National Fire Protection Association
IES-Illuminating Engineering Society

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BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

CHARLES A. GABRIEL, General, USAF
Chief of Staff

JAMES H. DELANEY, Colonel, USAF
Director of Administration

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